EPA/ROD/R05-91/156
1991

EPA Superfund
Record of Decision:

MAIN STREET WELL FIELD
EPA ID: IND980794358
OU 02
ELKHART, IN
03/29/1991

* IN-SITU VACUUM EXTRACTION OF VOCS IN CONTAMINATED SOIL;

* REMOVAL OF A SMALL PAINT LAYER AND OFF-SITE DISPOSAL IN ACCORDANCE WITH THE SOIL AND DEBRIS TREATABILITY VARIANCE;

* INSTALLATION OF NEW INTERCEPTORS ON THE WEST SIDE OF THE WELL FIELD TO PREVENT CONTINUED PLUME MIGRATION INTO THE WELL FIELD AND PROVIDE WELL FIELD RESTORATION;

* CONTINUED USE OF THE EXISTING AIR STRIPPER TO ASSURE A CLEAN DRINKING WATER SUPPLY;

* GROUND WATER MONITORING TO ASSURE ADEQUATE PERFORMANCE OF THE AIR STRIPPER AND ATTAINMENT OF GROUND WATER STANDARDS;

* DEED RESTRICTIONS ON EAST SIDE PROPERTY WITH CONTAMINATED SOIL UNTIL THE SOIL AND GROUND WATER CLEANUP STANDARDS ARE MET.

DECLARATION

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION, AND IS COST-EFFECTIVE. THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE FOR THIS SITE. THIS REMEDY SATISFIES THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT OF THE REMEDY.

BECAUSE THIS REMEDY MAY RESULT IN HAZARDOUS SUBSTANCES REMAINING ON-SITE ABOVE HEALTH BASED LEVELS, A REVIEW WILL BE CONDUCTED WITHIN FIVE YEARS AFTER COMMENCEMENT OF REMEDIAL ACTION TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

REGIONAL ADMINISTRATOR DATE 03/29/91

RECORD OF DECISION SUMMARY

MAIN STREET WELL FIELD
ELKHART, INDIANA

#SNLD
SITE NAME, LOCATION AND DESCRIPTION

THE WELL FIELD:

THE MAIN STREET WELL FIELD (MSWF) IS LOCATED IN THE CITY OF ELKHART, ELKHART COUNTY, INDIANA, AT 942 N. MAIN ST. IT COVERS APPROXIMATELY 48 ACRES. THE ELKHART WATER WORKS (EWW) MAINTAINS THREE WELL FIELDS CURRENTLY AND A FOURTH WELL FIELD WILL GO ON-LINE IN 1991 TO SUPPLEMENT THE CITY'S DEMAND. MSWF IS THE PRIMARY WATER SUPPLY FOR THE CITY AND SUPPLIES APPROXIMATELY 80 PERCENT OF EWW'S PRODUCTION CAPACITY FOR A CITY OF APPROXIMATELY 44,000 PEOPLE. THE WELL FIELD CURRENTLY CONTAINS 17 PRODUCTION WELLS, TWO EXISTING INTERCEPTORS USED AS PRODUCTION WELLS, TWO 2-MILLION GALLON STORAGE TANKS, AN AIR STRIPPING FACILITY, SIX RECHARGE PONDS AND A TREATMENT/PUMPING STATION (SEE FIGURE 1).

GEOLOGY/HYDROLOGY:

THE AQUIFER SYSTEM IN NORTHWEST ELKHART COUNTY CONSISTS OF COARSE SAND AND GRAVEL DEPOSITS AVERAGING 175 FEET IN THICKNESS. IN THE MSWF AREA, SAND AND GRAVEL (GLACIAL OUTWASH) OCCURS TO DEPTHS RANGING FROM 42 TO 58 FEET. THESE DEPOSITS CONSIST OF MIXED SANDS AND GRAVELS. REGIONALLY, BELOW THE OUTWASH IS A GRAY AND HARD TO VERY DENSE SILTY CLAY LAYER WHICH SEPARATES THE UNCONFINED AQUIFER FROM A DEEPER AQUIFER. THE LOWER AQUIFER RANGES FROM 0 TO 120 FEET THICK WITHIN THE CITY BOUNDARIES. THE CONFINING LAYER IS AT LEAST 10 TO 160 FEET THICK IN THE VICINITY OF MILES LABORATORY. THE MILES INVESTIGATIVE DATA, IN CONJUNCTION WITH DATA COLLECTED DURING ALL PHASES OF THE RI, INDICATES THAT THE LOWER AQUIFER INTERFINGERS WITH THE TILL LAYER AND EVENTUALLY PINCHES OUT LOCALLY NORTHWEST OF AND BENEATH THE WELL FIELD. THE TILL IS CONTINUOUS THROUGHOUT THE STUDY AREA AND THE LOWER AQUIFER APPEARS TO BE ABSENT BENEATH THE MSWF. THIS TILL LAYER ACTS AS AN AQUITARD OR CONFINING LAYER IN THE STUDY AREA. BENEATH THE CLAY AND SILT TILL LIE BEDROCK UNITS OF THE COLDWATER AND ELLSWORTH SHALES OF MISSISSIPPIAN AGE AND THE SUNBURY SHALE OF DEVONIAN AGE. SEE FIGURE 2.

THE REGIONAL AQUIFER, INCLUSIVE OF MSWF, IS PART OF A DESIGNATED SOLE SOURCE AQUIFER. THE DIRECTION OF REGIONAL GROUND WATER FLOW IS GENERALLY SOUTH, TOWARD THE ST. JOSEPH RIVER AND ITS TRIBUTARY, CHRISTIANA CREEK. THIS SOUTHERLY FLOW IS MORE PREDOMINANT EAST OF THE WELL FIELD. IN THE AREA WEST OF THE WELL FIELD, THE GROUND WATER FLOW TENDS FROM NORTHWEST TO SOUTHEAST TOWARD THE WELL FIELD. THE GROUND WATER FLOW IN THIS AREA IS SUBJECT TO INFLUENCE BY NATURAL FACTORS, SUCH AS CHRISTIANA CREEK AND BY GROUND WATER PUMPAGE AND RECHARGE. THE EFFECT OF MSWF ON GROUND WATER FLOW PATTERNS IS DEPENDENT UPON GROUND WATER LEVELS; THE NUMBER, LOCATION AND RATE OF PUMPING OF THE SUPPLY WELLS; THE RECHARGE FROM CHRISTIANA CREEK AND OTHER INDUSTRIAL GROUND WATER USE AND RECHARGE.

HORIZONTAL GRADIENTS IN THE UNCONFINED AQUIFER MEASURED IN THE DIRECTION OF GROUND WATER FLOW, RANGE FROM .003 TO .020 FT/FT. THESE GRADIENTS DO NOT REPRESENT NATURAL GRADIENTS BECAUSE OF THE DRAW-DOWN INDUCED BY VARIOUS PUMPING WELLS AND PUMPING RATES. SIMILARLY, THE PUMPING AND RECHARGE SIGNIFICANTLY AFFECTS THE GROUND WATER VELOCITY. THE REGIONAL VELOCITY IS APPROXIMATELY 102 FT/YEAR. HOWEVER, NEAR THE WELL FIELD IT CAN BE SIGNIFICANTLY HIGHER - 470 FT/YR MEASURED WEST OF THE WELL FIELD, AND 820 FT/YR MEASURED SOUTHEAST OF THE WELL FIELD.

THE WATER-TABLE CONFIGURATION IS DRAMATICALLY INFLUENCED BY ARTIFICIAL RECHARGE, DRAW-DOWN FROM THE MSWF, AND DRAW-DOWN FROM THE INDUSTRIAL WELLS IN THE STUDY AREA. THE RESPONSE OF THE WATER-TABLE IS DIRECTLY RELATED TO THE NUMBER OF WELLS PUMPING AND THE RATES AT WHICH THEY ARE PUMPED. SUBSEQUENTLY, THE GROUND WATER FLOW PATTERNS ARE ALSO IMPACTED AND CHANGE ON A DAILY, OR EVEN AN HOURLY BASIS. THEREFORE, THE DYNAMIC NATURE OF THE UNCONFINED AQUIFER AND IMPACT OF THE PUMPING-WELLS INDUCES A POTENTIAL FOR GROUND WATER MIXING AND RAPID FLUCTUATIONS IN FLOW VELOCITIES.

#SHEA
SITE HISTORY AND ENFORCEMENT ACTIVITIES:

CONTAMINATION HISTORY:

THE FIRST KNOWN INCIDENT OF GROUND WATER CONTAMINATION AT THE MSWF WAS IN THE MID-50'S. GROUND WATER WAS

CONTAMINATED WITH PHENOLS AS A RESULT OF RELEASES FROM A FUEL TANK FARM EAST OF THE WELL FIELD. THE CONTAMINATION PROBLEM WAS MITIGATED BY EXCAVATING SIX RECHARGE PONDS IN THE WELL FIELD AND DIVERTING WATER TO THOSE PONDS FROM CHRISTIANA CREEK. EWW ACQUIRED THE WATER RIGHTS TO CHRISTIANA CREEK FROM THE INDIANA-MICHIGAN STATE LINE TO MSWF.

IN 1981, MSWF WAS SAMPLED AS PART OF U. S. ENVIRONMENTAL PROTECTION AGENCY'S (EPA'S) NATIONAL GROUND WATER SUPPLY SURVEY. THE WELL FIELD WAS FOUND TO BE CONTAMINATED WITH TRICHLOROETHENE (TCE) AT 94 PPB, 1,2-DICHLOROETHENE (1,2-DCE) AT 33 PPB, 1,1,1-TRICHLOROETHANE (TCA) AT 5 PPB AND 1,1-DICHLOROETHANE (DCA) AT 2 PPB. OBSERVATION WELLS WERE INSTALLED NEAR AND ON THE EXCEL AND DURAKOOL PROPERTIES LOCATED ON THE EAST SIDE OF THE WELL FIELD. THE RESULTS OF THIS SAMPLING PROGRAM INDICATED THAT BOTH INDUSTRIES WERE LIKELY SOURCES OF GROUND WATER CONTAMINATION AFFECTING THE MSWF. THE CITY INSTALLED TWO INTERCEPTOR WELLS IN THE WELL FIELD ON THE EASTERN EDGE OF THE PROPERTY AND TOOK PRODUCTION WELLS NEAR THAT AREA OUT OF SERVICE. THE INTERCEPTOR WELLS WERE DISCHARGED TO CHRISTIANA CREEK UNDER AN NPDES PERMIT.

TCE LEVELS IN THE FINISHED WATER SUPPLY AND PRODUCTION WELLS DROPPED SIGNIFICANTLY FOLLOWING INSTALLATION OF THE INTERCEPTOR WELLS. HOWEVER, IN 1984, TCE LEVELS ON THE WEST SIDE OF THE WELL FIELD BEGAN TO INCREASE. ONE WELL INCREASED FROM 14 TO 75 PPB OF TCE. EPA SUSPECTED THAT A SEPARATE PLUME HAD REACHED OR BEEN DRAWN INTO THE WELL FIELD. IN 1985, ALL 15 PRODUCTION WELLS SHOWED MEASURABLE TCE LEVELS.

FIRST OPERABLE UNIT:

MSWF WAS PROPOSED FOR INCLUSION ON THE NATIONAL PRIORITIES LIST (NPL) IN DECEMBER 1982, AND WAS PLACED ON THE NPL IN SEPTEMBER, 1983. IN APRIL 1985, EPA BEGAN A PHASED FEASIBILITY STUDY (PFS) TO ADDRESS ALTERNATIVES FOR AN ALTERNATE WATER SUPPLY. IN AUGUST 1985, USEPA SIGNED A RECORD OF DECISION (ROD) RECOMMENDING AIR STRIPPING. THE FACILITY IS DESIGNED TO OBTAIN REMOVAL EFFICIENCIES OF 99.1 PERCENT OF TCE. SEVEN PRODUCTION WELLS PLUS THE TWO EAST SIDE INTERCEPTORS WERE PIPED TO THE AIR STRIPPER. THE FACILITY HAS A CAPACITY OF 6.45 MILLION GALLONS PER DAY. THE AIR STRIPPING FACILITY CONSISTS OF THREE STRIPPING UNITS (TOWERS); EACH HAS A DIAMETER OF 10 FEET, A TOWER HEIGHT OF 30 FEET AND A TOTAL STACK HEIGHT OF 55 FEET. THE AIR STRIPPER WENT ON-LINE IN SEPTEMBER 1987.

PREVIOUS STUDIES:

EAST SIDE

TWO COMPANIES OPERATING ON THE EAST SIDE OF THE WELL FIELD HAVE BEEN PRESENT SINCE THE 1920S AND 1930S. OVER THE YEARS, BOTH HAVE EXPANDED THEIR OPERATIONS AT THAT LOCATION AND THUS, THEIR BUILDINGS HAVE SEEN SEVERAL ADDITIONS AND CHANGES. EXCEL MANUFACTURES AUTOMOBILE AND TRUCK SASH AND WINDOW ASSEMBLIES. DURAKOOL MANUFACTURES RELAY AND TILT SWITCHES. BOTH INDUSTRIES HAVE USED TCE AND OTHER CHLORINATED SOLVENTS FOR DEGREASING IN THEIR PROCESSES. IN 1983, EXCEL AND DURAKOOL RETAINED THE SAME CONSULTANT TO CONDUCT A VOLUNTARY INVESTIGATION OF THEIR PROPERTIES. TCE CONCENTRATIONS IN SOIL ON THE EXCEL PROPERTY RANGED FROM 0 TO 570,000 PPB. ON THE DURAKOOL PROPERTY, CONCENTRATIONS RANGED FROM 0 TO 5,000 PPB. IN 1984, THE STATE AND EPA DETERMINED THAT THE INVESTIGATIVE WORK DONE BY EXCEL AND DURAKOOL WAS NOT ADEQUATE TO MEET THE REQUIREMENTS OF AN RI/FS. FEDERAL FUNDS WERE AUTHORIZED IN 1984 FOR A FEDERAL-LEAD RI/FS, BEGINNING WITH A PFS. SPECIAL NOTICE WAS ISSUED AFTER EPA COMPLETION OF THE PFS AND SIGNING OF THE ROD TO EXCEL AND DURAKOOL OFFERING THESE COMPANIES THE OPPORTUNITY TO IMPLEMENT THE AIR STRIPPER REMEDY AND COMPLETE THE RI/FS. THE RESPONSE WAS NOT ACCEPTABLE AND WAS THEREFORE, REJECTED. EPA AND THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM) FUNDED CONSTRUCTION OF THE AIR STRIPPER AND CONTINUED THE RI/FS AS FEDERALLY FUNDED RESPONSE ACTIVITIES.

WEST SIDE

LITTLE WAS KNOWN ABOUT WHY THE WESTERN PRODUCTION WELLS WERE CONTAMINATED IN 1984. THE IDEA OF A WESTERN PLUME WAS STILL ONLY A THEORY IN 1984. THIS SEEMED A LIKELY SCENARIO GIVEN THE HIGHLY INDUSTRIAL NATURE OF THE AREA WEST OF THE WELL FIELD. HOWEVER, WITHOUT MORE SPECIFIC INFORMATION, THERE WAS NO ONE TO NOTICE OR PROVIDE THE OPPORTUNITY TO UNDERTAKE THE RI/FS.

IDENTIFICATION OF SOURCES OF THE WEST SIDE CONTAMINATED PLUME IS MORE CHALLENGING THAN THE EAST OR NORTH SIDE OF THE WELL FIELD DUE TO THE DIVERSITY OF INDUSTRY, THE HIGHER BUILDING TENANT TURN-OVER AND THE ALMOST UBIQUITOUS USE OF CHLORINATED SOLVENTS, MANY RELATED TO METAL FINISHING OPERATIONS. SEVERAL PRIVATE RESPONSE ACTIONS HAVE BEEN PERFORMED ON THE WEST SIDE, HOWEVER, AND THESE SOURCE AREAS ARE LIKELY CONTRIBUTORS.

SOIL SAMPLING AND REMOVAL OF CONTAMINATED SOIL WAS CONDUCTED BY MILES LABORATORY BETWEEN 1984 AND 1985 AFTER

EXPOSING UNDERGROUND DEGREASING TANKS DURING DEMOLITION OF OLD BUILDINGS ON THE OLD ADAMS & WESTLAKE PROPERTY WHICH IT HAD PURCHASED. MILES REMOVED OVER 900 YARDS OF SOIL CONTAINING TCE AND 1,1,1-TCA.

TCE CONTAMINATION OF THE GROUND WATER WAS DISCOVERED ON ANOTHER PART OF THE MILES LABORATORY PROPERTY IN 1984. INVESTIGATIONS INTO THE LIKELY SOURCE OF CONTAMINATION SUGGESTED THAT THE SOURCE OF THE TCE CONTAMINATED GROUND WATER WAS WEST OF MILES (AT ELKHART PRODUCTS). TCE IS REPORTEDLY NOT USED BY MILES AT THIS FACILITY. IN 1985, AN ADDITIONAL RELEASE OF 180 GALLONS OF METHYLENE CHLORIDE, ETHYL ALCOHOL AND ACETONE OCCURRED AT THE MILES FACILITY. CONTAMINATED SOIL WAS REMOVED AND GROUND WATER RECOVERED. THIS AREA IS CURRENTLY UNDERGOING A RCRA FACILITY INVESTIGATION (RFI).

TCE SPILL EVENTS OCCURRED AT THE ELKHART PRODUCTS CORPORATION (EPC) SITE LOCATED WEST OF MILES LABORATORY. EPC IS A MANUFACTURER OF COPPER FITTINGS AND CUSTOM FABRICATED TUBULAR PRODUCTS. EPC INVESTIGATED THEIR OWN PROPERTY FROM AUGUST 1985 THROUGH FEBRUARY 1986. THEY ARE CURRENTLY VAPOR EXTRACTING CONTAMINATED SOIL AND TREATING CONTAMINATED GROUND WATER USING AIR STRIPPING.

#CMP
COMMUNITY PARTICIPATION:

EPA AND IDEM HAVE BEEN CONDUCTING COMMUNITY RELATIONS ACTIVITIES AT THE SITE SINCE 1985. FACT SHEETS WERE ISSUED PERIODICALLY TO INFORM THE COMMUNITY OF AIR STRIPPER CONSTRUCTION AND RI/FS PROGRESS. IN ADDITION, AN AVAILABILITY SESSION WAS HELD TO PROVIDE THE COMMUNITY, INCLUDING THE POTENTIALLY RESPONSIBLE PARTIES, AN OPPORTUNITY TO HAVE THEIR QUESTIONS ANSWERED.

THE REMEDIAL INVESTIGATION REPORT WAS RELEASED TO THE PUBLIC IN MAY, 1989. THE PHASE III TECHNICAL MEMORANDUM AND FEASIBILITY STUDY WAS RELEASED TO THE PUBLIC IN JANUARY, 1991. THESE DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN BOTH THE ADMINISTRATIVE RECORD MAINTAINED AT THE EPA REGION 5 OFFICE AND AT THE ELKHART PUBLIC LIBRARY AND AT THE INFORMATION REPOSITORY IN THE CITY ENGINEER'S OFFICE. THE NOTICE OF THE AVAILABILITY OF THESE TWO DOCUMENTS WAS PUBLISHED IN THE ELKHART TRUTH ON JANUARY 18, 1991. A PUBLIC COMMENT PERIOD WAS HELD FROM JANUARY 23, 1991 THROUGH MARCH 22, 1991. IN ADDITION, A PUBLIC MEETING WAS HELD ON FEBRUARY 7, 1991. AT THIS MEETING, REPRESENTATIVES FROM EPA AND IDEM ANSWERED QUESTIONS ABOUT SITE RISKS AND THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION. A RESPONSE TO THE COMMENTS RECEIVED DURING THIS PERIOD IS INCLUDED IN THE RESPONSIVENESS SUMMARY, WHICH IS PART OF THIS RECORD OF DECISION. THIS DECISION DOCUMENT PRESENTS THE SELECTED REMEDIAL ACTION FOR THE MSWF SITE IN ELKHART, INDIANA, CHOSEN IN ACCORDANCE WITH CERCLA, AS AMENDED BY SARA, AND, TO THE EXTENT PRACTICABLE, THE NATIONAL CONTINGENCY PLAN. THE DECISION FOR THIS SITE IS BASED ON THE ADMINISTRATIVE RECORD.

#SROU
SCOPE AND ROLE OF OPERABLE UNIT:

MAIN STREET WELL FIELD IS A MULTI-SOURCE, MULTI-PLUME SUPERFUND SITE. IT IS MORE COMPLEX THAN MOST SITES. AS A RESULT, EPA ORGANIZED THE WORK INTO OPERABLE UNITS (OUS). THESE ARE:

* OU ONE: ALTERNATE WATER SUPPLY
* OU TWO: EAST SIDE SOURCE CONTROL
* OU THREE: ADDITIONAL SOURCE CONTROL ACTION (IF REQUIRED)

EPA HAS ALREADY SELECTED A REMEDY FOR OU ONE (ALTERNATE WATER SUPPLY) AS DESCRIBED IN THE PREVIOUS SECTION. THE CONTAMINATED GROUND WATER IS A PRINCIPAL THREAT AT THIS SITE BECAUSE OF THE DIRECT INGESTION OF DRINKING WATER FROM A MUNICIPAL SYSTEM AND POTENTIAL UNRESTRICTED USE OF AN AQUIFER THAT CONTAINS CONTAMINANTS ABOVE HEALTH-BASED LEVELS.

THE PURPOSE OF THIS OU RESPONSE ACTION IS TO PREVENT CURRENT OR FUTURE EXPOSURE TO THE CONTAMINATED SOILS AND CONTAMINANT MIGRATION INTO THE GROUND WATER EAST OF THE WELL FIELD, AND TO PREVENT CURRENT AND POTENTIAL FUTURE CONTAMINANT MIGRATION INTO THE WELL FIELD FROM THE WEST, THUS RESTORING THE WELL FIELD TO ITS HIGHEST BENEFICIAL USE.

SINCE SIGNIFICANT UNCONTROLLED "HOT SPOTS" HAVE NOT BEEN IDENTIFIED WEST OF THE WELL FIELD, IT IS UNCERTAIN HOW LONG THE PLUME WILL CONTINUE TO EXIST. IF ADDITIONAL SOURCES ARE IDENTIFIED IN OTHER PARTS (WEST OR NORTH) OF THE STUDY AREA, AN ADDITIONAL OU MAY BE COMPLETED IN THE FUTURE.

#SSC
SUMMARY OF SITE CHARACTERISTICS:

SOIL INVESTIGATIONS AT THIS SITE WERE LIMITED TO SUSPECTED "HOT SPOT" AREAS. VOLATILE ORGANIC COMPOUNDS (VOCS) WERE THE CONTAMINANTS OF PRIMARY CONCERN FOR IDENTIFICATION OF HOT SPOTS. HOWEVER, CO-DISPOSAL WITH OTHER CONTAMINANTS NEEDED TO BE EVALUATED SO THAT REMEDIAL ACTION ALTERNATIVES COULD ADDRESS THE ENTIRE HOT SPOT. CONTAMINANTS SELECTED FOR INVESTIGATIVE PURPOSES WERE SELECTED BASED ON SUSPECTED MATERIAL DISPOSED OF. WHERE KNOWLEDGE OF POSSIBLE DISPOSED MATERIAL WAS TOO LIMITED, FULL CHEMICAL SCAN WAS CONDUCTED.

THE STUDY AREA, OR SITE BOUNDARY, WAS DEFINED BY THE GROUND WATER CAPTURE ZONE OF THE WELL FIELD AND BY THE TOTAL AREA OF GROUND WATER CONTAMINATION WITHIN THE CAPTURE ZONE. THESE BOUNDARIES WERE MEASURED SEVERAL TIMES OVER THE COURSE OF THE RI/FS DUE TO THE DYNAMIC NATURE (RAPID AND FREQUENT CHANGES) OF THE CAPTURE ZONE, AND BECAUSE ITS EXTENT DEFINED HOW FAR WEST EPA'S RESPONSE AUTHORITIES EXTENDED UNDER THIS CERCLA SITE. THIS CAPTURE ZONE IS SHOWN ON FIGURE 3. GROUND WATER IS UNCONTAMINATED UPGRADIENT OF ELKHART PRODUCTS CO. ON THE WEST SIDE AND UPGRADIENT OF EXCEL ON THE EAST SIDE. SOUTH OF THESE LOCATIONS GROUND WATER IS CONTAMINATED AND CONSTITUTES THE GROUND WATER STUDY AREA. THIS AREA IS OVER 300 ACRES, APPROXIMATELY HALF OF WHICH IS INDUSTRIAL. IN CONDUCTING THIS RI/FS, NO ATTEMPT WAS MADE TO PROVIDE A COMPREHENSIVE RI/FS ON EACH PROPERTY. INSTEAD, AREAS OF KNOWN OR SUSPECTED DISPOSAL WERE THE FOCUS OF INVESTIGATIVE EFFORTS. PRIORITY WAS GIVEN TO THOSE AREAS WHICH REMAINED UNREMEDIATED OR WHERE REMEDIATION WAS COMPLETED, BUT RESIDUAL CONTAMINATION CONCENTRATIONS WERE UNKNOWN. THIS APPROACH PRIORITIZED EFFORTS AND RESOURCES TO PROVIDE THE HIGHEST AMOUNT OF CONTAMINANT REDUCTION FOR THE EFFORT EXPENDED.

ALL MEDIA WERE SAMPLED, INCLUDING AIR, SOIL, SURFACE WATER AND GROUND WATER. FIGURE 4 SHOWS THE DISTRIBUTION OF TCE IN THE HOT SPOT AREAS ON THE EAST SIDE OF THE WELL FIELD. TCE RANGED FROM 0 TO 88,000 PPB ON THE EXCEL PROPERTY AND FROM 0 TO 29,000 PPB ON THE DURAKOOL PROPERTY. ALTHOUGH OTHER VOCS ARE PRESENT, TCE IS THE MOST WIDE SPREAD AND PRESENT IN THE HIGHEST CONCENTRATIONS. THE DISTRIBUTION OF OTHER VOC CONTAMINANTS IS DISCUSSED IN THE RI REPORT. CHEMICALS DETECTED IN A LEAST ONE SOIL OR GROUND WATER SAMPLE ARE SHOWN ON TABLES 1 AND 2. SIGNIFICANT CONCENTRATIONS OF VOCS WERE NOT DETECTED IN WEST SIDE SOIL (GENERALLY BELOW 50 PPB), THEREFORE, HOT SPOTS COULD NOT BE DEFINED. WHILE OTHER CONTAMINANTS, SUCH AS INORGANICS AND POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS) WERE PRESENT ON THE WEST SIDE, THEIR PRESENCE WAS
NOT ASSOCIATED WITH VOCS, THEREFORE, THIS OPERABLE UNIT RI/FS DID NOT EVALUATE THE EXTENT OF SUCH CONTAMINATION.

FIGURE 5 SHOWS TCE GROUND WATER CONCENTRATION CONTOURS FROM BOTH EAST SIDE AND WEST SIDE PLUMES. THE EAST SIDE PLUME WAS MEASURED AT A MAXIMUM OF 300 PPB AND THE WEST SIDE PLUME WAS MEASURED AT A MAXIMUM OF 570 PPB. THE GROUND WATER CONTOUR IS SOMEWHAT SIMPLISTIC SINCE THE PLUMES ARE COMMINGLED. THE RELATIONSHIP OF TCE FOUND IN ONE WELL TO ANOTHER WELL IS UNKNOWN. ANALYSIS OF OTHER GROUND WATER CONTAMINANTS SHOWED THAT SEVERAL INORGANICS WERE PRESENT ABOVE BACKGROUND, PARTICULARLY ON THE WEST SIDE. THESE INORGANICS WERE EVALUATED IN ACCORDANCE WITH THE RISK ASSESSMENT PROCEDURES.

DURING PHASE III FIELD INVESTIGATIONS, A SMALL PAINT LAYER WAS NOTED IN TWO OF THREE BORINGS TAKEN IN SUSPECTED DISPOSAL AREAS ON THE EXCEL PROPERTY. THE PAINT LAYER IS NOT WELL CHARACTERIZED CHEMICALLY OR IN TERMS OF ITS ACTUAL EXTENT. THIS LAYER WAS FOUND TO CONTAIN THE HIGHEST LEVEL OF TCE (88,000 PPB), XYLENE (2,300 PPM) AND LEAD (2,900 PPM). THE LAYER WAS VISUALLY DISTINCT AND SAMPLES TAKEN BELOW THE LAYER SHOW THAT THE CONTAMINANTS WERE RELATIVELY WELL BOUND.

AIR AND SURFACE WATER PATHWAYS WERE NOT CONSIDERED SIGNIFICANT SINCE NO SITE RELATED CONTAMINATION ABOVE BACKGROUND WAS FOUND IN MONITORING DATA. THE AIR PATHWAY WAS MODELED IN THE RISK ASSESSMENT FOR THOSE CHEMICALS WHICH MAY PRESENT A POTENTIAL FUTURE RISK IF AIRBORNE.

#SSR
SUMMARY OF SITE RISKS:

A RISK ASSESSMENT WAS CONDUCTED IN ACCORDANCE WITH THE RISK ASSESSMENT GUIDANCE FOR SUPERFUND (RAGS). THE PURPOSE OF A RISK ASSESSMENT IS TO ANALYZE THE POTENTIAL ADVERSE HEALTH EFFECTS, BOTH CURRENT AND POTENTIAL FUTURE, WHICH MAY BE POSED BY HAZARDOUS SUBSTANCES RELEASED FROM A SITE IF NO ACTION WERE TAKEN TO MITIGATE SUCH RELEASES. THE RISK ASSESSMENT CONSISTS OF CONTAMINANT IDENTIFICATION (DATA EVALUATION AND SELECTION OF CONTAMINANTS OF CONCERN), TOXICITY ASSESSMENT, EXPOSURE ASSESSMENT, AND RISK CHARACTERIZATION.

CONTAMINANT IDENTIFICATION:

THE RISK ASSESSMENT SCREENED ALL THE DETECTED CHEMICALS IN ORDER TO IDENTIFY THE POTENTIAL CHEMICALS OF CONCERN. SCREENING WAS BASED ON DATA QUALITY, FREQUENCY OF DETECTION, COMPARISON TO BACKGROUND, AND TOXICITY IN ACCORDANCE WITH THE RAGS. THE POTENTIAL CHEMICALS OF CONCERN FOR THE EAST SIDE SOIL AND GROUND

WATER PATHWAYS REMAINING AFTER SCREENING ARE SHOWN BELOW.

GROUND WATER	SOIL
TETRACHLORETHANE (C)	ARSENIC (C)
TRICHLOROETHENE (C)	TRICHLOROETHENE (C)
VINYL CHLORIDE (C)	CARCINOGENIC PAHS (C)
BARIUM	ANTIMONY
CIS-1,2-DICHLOROETHENE	MERCURY
TRANS-1,2-DICHLOROETHENE	XYLENE

(C) INDICATES CARCINOGENS OR POTENTIAL CARCINOGENS, ALL OTHERS ARE NON-CARCINOGENS.

THE RISK ASSESSMENT PROVIDES A CHARACTERIZATION OF THE WEST SIDE PLUME FOR THE PURPOSE OF IDENTIFYING CONTAMINANTS IN ADDITION TO VOCS THAT MAY BE A CONCERN ENTERING THE WELL FIELD. A SUMMARY OF RISK ESTIMATES FOR THE WEST SIDE PLUME ARE FOUND ON PAGE 11 OF THIS DECISION SUMMARY.

EXPOSURE ASSESSMENT:

THE EXPOSURE ASSESSMENT INCLUDES REASONABLE MAXIMUM SCENARIOS FOR CURRENT AND FUTURE USE. UNDER THE NO-ACTION ALTERNATIVE, THE CURRENT EXPOSURE SCENARIO ASSUMES THE AIR STRIPPER IS NOT IN PLACE AND THEREFORE, A WORKER AT THE EAST SIDE PROPERTY HAS EXPOSURE TO CONTAMINATED SOIL AND DRINKING WATER FROM THE EAST SIDE PLUME UNTREATED FOR 40 YEARS. A FUTURE SCENARIO INCLUDES RE-ZONING THE EAST SIDE PROPERTY FROM INDUSTRIAL TO RESIDENTIAL USE. ADULTS AND CHILDREN LIVING IN THE HOMES WOULD BE EXPOSED TO CHEMICALS POTENTIALLY REMAINING IN SITE SOILS, AND THE RESIDENTS WOULD DRINK THE GROUND WATER UNTREATED BY THE AIR STRIPPER FOR 30 YEARS. THE EXPOSURE PATHWAYS ARE SUMMARIZED IN THE RISK ASSESSMENT.

TOXICITY ASSESSMENT:

THE TOXICITY ASSESSMENT WEIGHS AVAILABLE EVIDENCE REGARDING THE POTENTIAL FOR PARTICULAR CONTAMINANTS TO CAUSE ADVERSE EFFECTS IN EXPOSED INDIVIDUALS AND PROVIDES, WHERE POSSIBLE, AN ESTIMATE OF THE RELATIONSHIP BETWEEN THE EXTENT OF EXPOSURE TO A CONTAMINANT AND THE INCREASED LIKELIHOOD AND/OR SEVERITY OF ADVERSE EFFECTS, INCLUDING CARCINOGENIC AND NONCARCINOGENIC EFFECTS.

THE TOXICITY VALUES USED IN THIS ASSESSMENT ARE SUMMARIZED IN TABLE 3. CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG-DAY)-1, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG-DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS.)

REFERENCE DOSES (RFDS) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDS, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDS ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDS WILL NOT UNDERESTIMATE THE POTENTIAL FOR OCCURRENCE OF ADVERSE NONCARCINOGENIC EFFECTS.

RISK CHARACTERIZATION:

TABLES 4 AND 5 SUMMARIZE THE RISK CHARACTERIZATION RESULTS. ARSENIC AND CARCINOGENIC PAHS WERE INCLUDED AS CHEMICALS OF POTENTIAL CONCERN AS A RESULT OF APPLICATION OF THE SIMPLIFIED SCREENING PROCEDURES DESCRIBED ABOVE. HOWEVER, IF BACKGROUND COMPARISON AND TOXICITY-CONCENTRATION SCREENS HAD BEEN BASED ON AVERAGE CONCENTRATIONS INSTEAD OF MAXIMUM SAMPLE CONCENTRATIONS, THEY WOULD HAVE BEEN EXCLUDED AS POTENTIAL CHEMICALS

OF CONCERN. THEY ARE SHOWN TO CONTRIBUTE A RISK NOT GREATER THAN 1 X (10-5). SINCE THEIR SITE-RELATEDNESS WAS QUESTIONABLE, AS WAS THEIR ASSOCIATION WITH LIKELY INDUSTRIAL PROCESSES, THEIR PRESENCE WAS THOUGHT TO BE WITHIN BACKGROUND VARIABILITY. THE CHEMICALS OF CONCERN WERE REDUCED TO VOCS ONLY.

EXCESS LIFETIME CANCER RISKS ARE DETERMINED BY MULTIPLYING THE INTAKE LEVEL WITH THE CANCER POTENCY FACTOR. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION (E.G., 1 X (10-6) OR 1E-6). AN EXCESS LIFETIME CANCER RISK OF 1 X (10-6) INDICATES THAT AS A PLAUSIBLE UPPER BOUND, AN INDIVIDUAL HAS ONE IN ONE MILLION CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE SPECIFIC EXPOSURE CONDITIONS AT THE SITE.

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (OR THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATION IN A GIVEN MEDIUM TO THE CONTAMINANT'S REFERENCE DOSE). BY ADDING THE HQS FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA.

THE BASELINE RISK ASSESSMENT YIELDS THE FOLLOWING CONCLUSIONS:

EAST SIDE AND WELL FIELD GROUND WATER, EAST SIDE SOILS

* TOTAL ESTIMATED EXCESS CANCER RISK FOR CURRENT WORKERS IS 1 X (10-4) (OR, 1 IN 10,000). GROUND WATER EXPOSURE ACCOUNTS FOR MORE THAN 99 PERCENT OF THE RISK. OVER 98 PERCENT OF THE RISK DUE TO GROUND WATER EXPOSURE IS FROM CONTAMINATION BY VINYL CHLORIDE AND PCE.

* TOTAL ESTIMATED EXCESS CANCER RISK FOR FUTURE RESIDENTS IS 3 X (10-4). GROUND WATER EXPOSURE CONTRIBUTES APPROXIMATELY 97 PERCENT OF THE TOTAL RISK. OVER 97 PERCENT OF THE RISK DUE TO GROUNDWATER EXPOSURE IS FROM CONTAMINATION BY VINYL CHLORIDE AND PCE.

* ARSENIC AND CARCINOGENIC PAHS POSE RISK LESS THAN 1 X (10-5) FROM INGESTION OF CONTAMINATED SOIL BY HYPOTHETICAL FUTURE RESIDENTS. CONTAMINATION LEVELS OF THESE CHEMICALS IN EAST SIDE SOILS APPEAR TO BE SIMILAR TO BACKGROUND AND MAY NOT BE SITE RELATED.

* NONCARCINOGENIC EFFECTS IN CURRENT WORKERS OR FUTURE RESIDENTS ARE UNLIKELY, SINCE NO HAZARD INDICES EXCEEDED 1.0.

WEST SIDE AND WELL FIELD GROUND WATER

* TOTAL ESTIMATED EXCESS CANCER RISK FOR CURRENT WORKERS IS 8 X (10-4). OVER 89 PERCENT OF THE RISK DUE TO GROUND WATER EXPOSURE IS FROM CONTAMINATION BY ARSENIC, 1,1-DCE AND VINYL CHLORIDE.

* TOTAL ESTIMATED EXCESS CANCER RISK FOR FUTURE RESIDENTS IS 6 X (10-4). OVER 89 PERCENT OF THE RISK DUE TO GROUND WATER EXPOSURE IS FROM CONTAMINATION BY ARSENIC, 1,1-DCE AND VINYL CHLORIDE.

* NONCARCINOGENIC EFFECTS IN CURRENT WORKERS FOR FUTURE RESIDENTS ARE UNLIKELY, SINCE NO HAZARD EXCEEDED 1.0.

ENVIRONMENTAL RISKS

ENVIRONMENTAL RECEPTORS ARE THOUGHT TO BE CHRISTIANA CREEK AND THE ST. JOSEPH RIVER. THE RECHARGE PONDS ARE NOT CONSIDERED A SIGNIFICANT ENVIRONMENTAL RECEPTOR OF CONTAMINATED GROUND WATER DUE TO THE HYDROLOGIC RELATIONSHIP BETWEEN THE PONDS AND THE GROUND WATER IN THAT THE GRADIENT IS FROM THE PONDS TO THE GROUND WATER, REVERSAL IS NOT LIKELY. IN ADDITION, THE PONDS ARE DREDGED EVERY 2 YEARS TO ENSURE MAXIMUM

INFILTRATION RATES. SAMPLES TAKEN FROM SURFACE WATER AND SEDIMENT WITHIN THE WELL FIELD SHOWED NO VOCS. THE CITY DISCHARGED GROUND WATER FROM THE EAST SIDE INTERCEPTOR WELLS INTO THE CREEK UNDER AN NPDES PERMIT PRIOR TO CONSTRUCTION OF THE AIR STRIPPER. CURRENTLY, THE GROUND WATER IS PUMPED FROM THESE INTERCEPTOR WELLS DIRECTLY TO THE AIR STRIPPER. THE INTERCEPTOR DISCHARGE TO THE CREEK WAS SAMPLED PRIOR TO CONSTRUCTION OF THE AIR STRIPPER AND FOUND TO CONTAIN 94 PPB OF TCE, 21 PPB OF 1,2-DCE AND 2 PPB OF 1,1,1-TCE. DOWNSTREAM SAMPLES WERE FREE OF VOCS. AS SUSPECTED, IT IS LIKELY THAT THE CONTAMINANTS DISCHARGED TO THE CREEK VOLATILIZED BEFORE MOVING FAR DOWNSTREAM. ONE SAMPLE TAKEN IN THE CREEK FAR DOWNSTREAM SHOWED TCE AT 8 PPB. THE SOURCE OF THIS CONTAMINATION IS UNCERTAIN.

THE ST. JOSEPH RIVER IS DESIGNATED RECREATIONAL USE BY IDEM. THE IDEM ADOPTED WATER QUALITY CRITERIA FOR TCE FOR PROTECTION OF HUMAN INGESTION OF FISH IS 807 PPB. NO CRITERIA HAVE BEEN ESTABLISHED FOR PROTECTION OF AQUATIC LIFE. THE FEDERAL WATER QUALITY CRITERIA (WQC) FOR PROTECTION OF AQUATIC ORGANISMS AT CHRONIC EXPOSURE LEVELS FOR TCE IS 21,900 PPB. FOR HUMAN INGESTION OF FISH AT A 1 X (10-5) RISK, THE WQC FOR TCE IS ALSO 807 PPB. GROUND WATER MONITORING WELL DATA NEAR THE ST. JOSEPH RIVER SHOWED TCE AT 12 PPB FOR THE HIGHEST CONCENTRATION. THIS IS WELL BELOW STATE AND FEDERAL WQC. VOCS WERE NOT DETECTED IN SEDIMENTS IN THE ST. JOSEPH RIVER.

MSWF WAS IDENTIFIED AS A WETLAND AND A FLOODPLAIN. PAH AND INORGANIC COMPOUNDS WERE DETECTED IN CREEK AND RIVER SEDIMENTS. THESE WERE ATTRIBUTED TO NATURAL AND ANTHROPOGENIC SOURCES UNRELATED TO THE HOT SPOTS OF CONCERN IN THE STUDY AREA. THIS IS MORE THOROUGHLY DISCUSSED IN SECTION 5 OF THE RI REPORT. IT WAS CONCLUDED THAT THE POTENTIAL FOR ENVIRONMENTAL EFFECTS IS LOW.

#DOA
DESCRIPTION OF ALTERNATIVES:

BASED ON THE FINDINGS OF THE REMEDIAL INVESTIGATION AND RISK ASSESSMENT, THE FOLLOWING REMEDIAL ACTION OBJECTIVES WERE DEVELOPED FOR THE MSWF SITE:

* CONTINUE TO PROVIDE A SAFE SOURCE OF DRINKING WATER THROUGH ON-GOING USE OF THE AIR STRIPPER.

* CONTROL MIGRATION OF CONTAMINATED GROUND WATER TO THE WELL FIELD TO MINIMIZE EXISTING GROUND WATER CONTAMINATION WITHIN THE WELL FIELD.

* MINIMIZE RISK TO HUMAN HEALTH AND THE ENVIRONMENT FROM DIRECT CONTACT WITH CONTAMINATED SOIL.

* REDUCE MIGRATION OF SOIL CONTAMINANTS TO THE GROUND WATER IN AREAS OF KNOWN CONTAMINATION.

THE FEASIBILITY STUDY DOCUMENTS TECHNOLOGY AND ALTERNATIVE SCREENING STEPS. THE ALTERNATIVES EVALUATED IN DETAIL INCLUDE:

1. NO ACTION

2. IN-SITU VACUUM EXTRACTION OF CONTAMINANTS IN SOIL (EAST SIDE), PAINT LAYER REMOVAL, MAINTAIN CURRENT WELL AND AIR STRIPPING SYSTEM, DEED RESTRICTIONS, AND GROUND WATER MONITORING

3. LOW TEMPERATURE THERMAL DESORPTION AND IN-SITU VACUUM EXTRACTION OF CONTAMINANTS IN SOIL (EAST SIDE), PAINT LAYER REMOVAL, MAINTAIN CURRENT WELL AND AIR STRIPPING SYSTEM, DEED RESTRICTIONS, AND GROUND WATER MONITORING.

4. IN-SITU VACUUM EXTRACTION OF CONTAMINANTS IN SOIL (EAST SIDE), PAINT LAYER REMOVAL, NEW INTERCEPTOR WELL SYSTEM, CURRENT AIR STRIPPER, DEED RESTRICTIONS, AND GROUND WATER MONITORING.

5. LOW TEMPERATURE THERMAL DESORPTION TO REMOVE CONTAMINANTS IN SOIL (EAST SIDE), IN-SITU VACUUM EXTRACTION OF CONTAMINANTS (EAST SIDE), PAINT LAYER REMOVAL, NEW INTERCEPTOR WELL SYSTEM, CURRENT AIR STRIPPER, DEED RESTRICTIONS, AND GROUND WATER MONITORING.

CONSISTENT WITH THE AGENCY'S INTENT TO STREAMLINE FEASIBILITY STUDIES BY RECOGNIZING OBVIOUS REMEDIES, A CONTAINMENT ALTERNATIVE WAS NOT EVALUATED AS A STAND ALONE ALTERNATIVE. VOCS ARE READILY AMENABLE TO TREATMENT. IN ADDITION, CONTAINMENT FOR A LARGE VOLUME OF SOIL ON ACTIVELY USED PROPERTY WOULD RELY SIGNIFICANTLY ON INSTITUTIONAL CONTROLS OVER A HIGHLY VULNERABLE AQUIFER AND WOULD NOT BE CONSISTENT WITH THE STATUTORY PREFERENCE FOR TREATMENT. SEE 42 USC SECTION 9621 AND 40 CFR 300.430(A)(1).

ELEMENTS COMMON TO ALL ALTERNATIVES:

IN-SITU VACUUM EXTRACTION (ISVE): TABLE 6 AND FIGURE 6 SHOW THE AREAS AND ESTIMATED VOLUMES OF CONTAMINATION. THE MASS OF CHLORINATED SOLVENTS COULD RANGE FROM LESS THAN 200 POUNDS TO GREATER THAN 1,000 POUNDS. THE HOT SPOTS SHOWN RESULT FROM DISPOSAL AND/OR SPILLAGE OF SOLVENTS, USED PRIMARILY IN DEGREASING OPERATIONS AT EXCEL AND DURAKOOL. THE AREAS OF HIGHEST CONTAMINATION TEND TO BE THE SURFICIAL SOILS AND THE WATER TABLE INTERFACE WHERE CONTAMINATION MAY HAVE BEEN TRANSPORTED FARTHER DISTANCES BY THE FLUCTUATING WATER TABLE. THESE ESTIMATES WERE BASED ON EPA STUDIES AND PREVIOUS DATA FROM THE EXCEL AND DURAKOOL 1983 STUDIES. THESE ESTIMATES REPRESENT A MINIMUM VOLUME AND AREA OF CONTAMINATION. THE ACTUAL EXTENT OF CONTAMINATION BENEATH THE BUILDINGS IS UNKNOWN. DURING THE DESIGN PHASE, THIS WILL NEED TO BE DELINEATED.

ISVE IS INCLUDED IN ALL ALTERNATIVES, EITHER AS A STAND ALONE TECHNOLOGY OR AS USED IN CONJUNCTION WITH LOW TEMPERATURE THERMAL DESORPTION (LTTD). THE BUILDINGS ON THE EAST SIDE ARE CONSTRUCTED ON 4 INCH CONCRETE SLABS. PENETRATING THE FOUNDATIONS FOR VAPOR WELL EXTRACTION POINTS IS TECHNOLOGICALLY FEASIBLE AND PREFERABLE TO REMOVING THESE ACTIVE MANUFACTURING FACILITIES FOR REMEDIATION OF THE VOCS (AS MAY BE REQUIRED IF LTTD WASLLECT DECONTAMINATION FLUIDS AND A STORAGE AREA FOR REQUIRED IF LTTD WAS USED ALONE). THUS LTTD IS COMBINED WITH ISVE IN TWO OF THE FOUR ALTERNATIVES.

PAINT LAYER REMOVAL: DURING PHASE III OF THE INVESTIGATION, A SMALL PAINT RESIDUE LAYER CONTAINING XYLENES (2,300 PPM), LEAD (2,910 PPM), AS WELL AS TCE AND OTHER SOLVENTS WAS NOTED. THE PAINT LAYER (APPROXIMATELY 30 CUBIC YARDS) IS POORLY DEFINED BY THE FEW BORINGS PLACED IN THE DISPOSAL AREA AND LIMITED CHEMICAL ANALYSIS. HOWEVER, THE BORING LOGS IN COMBINATION WITH INFORMATION PROVIDED BY A HAND SKETCHED DIAGRAM OF THE DISPOSAL AREA, SUGGESTS THAT THE PAINT RESIDUE LAYER IS VERY LIMITED AND VISUALLY DISTINCT. CHEMICAL RESULTS SHOWED THAT CONTAMINANTS WITHIN THE LAYER APPEAR TO BE WELL BOUND AND NOT LEACHING APPRECIABLY. A SIMILAR DISPOSAL AREA IS THOUGHT TO EXIST BENEATH THE BUILDING (BASED ON AN AERIAL PHOTOGRAPH). THE VOLUME ESTIMATED FOR DISPOSAL CONSERVATIVELY PRESUMES THAT THE DISPOSAL AREA INSIDE THE BUILDING ALSO CONTAINS PAINT. THEREFORE, THE VOLUME ESTIMATE WAS DOUBLED TO 60 CUBIC YARDS. TCE IS MIXED WITH THE PAINT. PAINT HAS A HIGH ORGANIC CONTENT AND LOW POROSITY, THEREFORE, THE VOCS MIXED IN THE PAINT WOULD TEND TO REMAIN BOUND AND WOULD NOT BE EXTRACTED WITH ISVE TECHNOLOGY. IN ADDITION, LEAD EXCEEDS ACCEPTABLE LEVELS AND IS NOT EXTRACTABLE WITH ISVE. DUE TO THE VERY SMALL VOLUME OF SOIL ASSOCIATED WITH THIS PAINT RESIDUE, ON-SITE TREATMENT TECHNOLOGIES WOULD NOT BE COST EFFECTIVE AND THEREFORE, WERE NOT EVALUATED.

CURRENT WELL AND AIR STRIPPER SYSTEM: THIS COMPONENT REQUIRES THAT OPERATION OF THE AIR STRIPPER BE CONTINUED IN ORDER TO MEET THE NEED FOR A PERMANENTLY SAFE DRINKING WATER SUPPLY SYSTEM. MAINTAINING THE CURRENT SYSTEM ALSO INCLUDES MONITORING TO ASSURE ADEQUATE PERFORMANCE, OPERATION AND MAINTENANCE OF THE SYSTEM AND FORCE MAINS CONNECTING THE EXISTING PRODUCTION WELLS TO THE AIR STRIPPER.

DEED RESTRICTIONS: DEED RESTRICTIONS ARE INCLUDED FOR THE EAST SIDE SOIL AND GROUND WATER CONTAMINATED PROPERTY UNTIL SUCH TIME AS THE CLEANUP STANDARDS ARE MET AND SUSTAINED FOR AT LEAST 5 YEARS. THE CITY OF ELKHART HAS BEEN REQUESTED TO PREVENT RESIDENTIAL EXPOSURE TO THE PLUME ON THE WEST SIDE THROUGH WHATEVER MEANS AVAILABLE.

ALTERNATIVE 1: NO ACTION

THE NO ACTION ALTERNATIVE INVOLVES NO GROUND WATER INTERCEPTION OR TREATMENT. THEREFORE, THE EXISTING AIR STRIPPER WOULD BE ABANDONED AND THERE WOULD BE NO PUMPING OF GROUND WATER FOR THE PURPOSES OF CONTAMINANT INTERCEPTION. THE NO ACTION ALTERNATIVE WILL RESULT IN RISK ASSOCIATED WITH THE GROUND WATER AND SOIL IDENTIFIED ON THE EAST SIDE. THE RISK ASSOCIATED WITH THE NO ACTION ALTERNATIVE WOULD REMAIN AT 3 X (10-4) FOR THE CURRENT WORKER AND POTENTIAL FUTURE RESIDENT ON THE EAST SIDE AND AT 9 X (10-4) (CURRENT WORKER) AND 7 X (10-4) (POTENTIAL FUTURE RESIDENT) ON THE WEST SIDE. THUS, WITHOUT ANY CLEANUP, THE POTENTIAL LIFETIME EXCESS CANCER RISK WILL EXCEED THE ACCEPTABLE RISK RANGE OF (10-4) TO (10-6).

THE TOTAL PRESENT NET WORTH OF ALTERNATIVE 1 IS PRESUMED TO BE NOTHING.

ALTERNATIVE 2: IN-SITU VACUUM EXTRACTION, PAINT LAYER REMOVAL, CURRENT WELL SYSTEM, CURRENT AIR STRIPPER, DEED RESTRICTIONS, AND GROUND WATER MONITORING

ALTERNATIVE 2 INCORPORATES THE USE OF IN-SITU VACUUM EXTRACTION (ISVE) TO REMEDIATE THE VOLATILE ORGANIC CONTAMINANTS DOCUMENTED IN THE HOT SPOTS OF SOIL CONTAMINATION ON THE EAST SIDE. EXTRACTION AND TREATMENT OF THE CONTAMINATED GROUND WATER IS ACCOMPLISHED BY MAINTAINING THE EXISTING INTERCEPTOR SYSTEM AND AIR STRIPPER TREATMENT FACILITY.

MAINTAINING THE OPERATION OF THE EXISTING INTERCEPTOR WELLS AND AIR STRIPPER PROVIDES CONTROL OF THE GROUND WATER CONTAMINANT PLUME INTO THE WELL FIELD FROM THE EAST SIDE BUT DOES NOT PROVIDE CONTROL OF CONTAMINATED GROUND WATER FROM THE WEST SIDE.

ISVE IS A PROCESS TO REMOVE OR RECOVER VOCS IN VADOSE-ZONE (UNSATURATED) SOIL. A SUBSURFACE GRADIENT IS CREATED AND VAPORIZED VOLATILE CONTAMINANTS MIGRATE THROUGH THE AIR SPACES BETWEEN SOIL PARTICLES TOWARD EXTRACTION POINTS WHERE THEY ARE RECOVERED. IF EMISSIONS CONTROL IS NEEDED, THE REMOVED VOCS ARE PROCESSED THROUGH A LIQUID-VAPOR SEPARATOR AND THEN TREATED BY AN ACTIVATED CARBON BED, CATALYTIC CONVERTER, AFTERBURNER. IMPLEMENTATION OF ISVE WOULD INCLUDE INSTALLING AT LEAST 50 EXTRACTION WELLS TO THE WATER TABLE, INSTALLING BLOWERS, PIPING AND A TEMPORARY SUPPORT BUILDING. THE DURATION OF THE TREATMENT REQUIRED TO ATTAIN THE SOIL CLEANUP STANDARD IS ESTIMATED AS 12 MONTHS.

DEED RESTRICTIONS ARE USED TO PREVENT USE OF GROUND WATER ON THE EAST SIDE UNTIL SUCH TIME AS THE SOIL AND GROUND WATER STANDARDS ARE MET.

IN ADDITION TO TREATMENT OF THE TCE CONTAMINATED SOILS, THE PAINT LAYER WILL BE REMOVED, SAMPLED FOR THE TARGET COMPOUND LIST AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH RCRA. ADDITIONAL CHARACTERIZATION OF THE PAINT LAYER WILL BE REQUIRED IN THE DESIGN PHASE IN ORDER TO DETERMINE THE PRIMARY FUNCTIONAL GROUPS OF CONCERN. BASED ON THAT INFORMATION, AN OFF-SITE TREATMENT TECHNOLOGY WILL BE SELECTED. COST ESTIMATES ARE BASED ON THERMAL DESTRUCTION (INCINERATION).

THE PRESENT NET WORTH OF ALTERNATIVE 2 IS ESTIMATED AT $3.8 MILLION.

ALTERNATIVE 3: LOW TEMPERATURE THERMAL DESORPTION, IN-SITU VACUUM EXTRACTION, PAINT LAYER REMOVAL, CURRENT WELL SYSTEM, CURRENT AIR STRIPPER, DEED RESTRICTION, AND GROUND WATER MONITORING.

ALTERNATIVE 3 ADDRESSES THE SOIL CONTAMINATION IN THE EAST SIDE HOT SPOTS BY MEANS OF REMOVAL, TO THE EXTENT PRACTICABLE, FOLLOWED BY THERMAL TREATMENT OF THE SOILS WITH AN ON-SITE LOW TEMPERATURE THERMAL DESORPTION (LTTD) TREATMENT SYSTEM. RECOGNIZING THAT EXCAVATION OF LARGE QUANTITIES OF SOIL NEXT TO AND/OR BENEATH THE BUILDINGS MAY NOT BE DESIRED OR NECESSARY, ISVE IS PROPOSED TO REMOVE THE REMAINING VOC CONTAMINATION IN THESE AREAS.

TWO DIFFERENT LTTD SYSTEMS ARE CURRENTLY IN OPERATION. ONE IS DIRECTLY FIRED, FORCING HEATED AIR COUNTER-CURRENT TO THE FLOW OF SOILS AND THE OTHER SYSTEM IS INDIRECTLY FIRED USING AN OXYGEN FREE ATMOSPHERE. BOTH SYSTEMS USE ROTARY DRUMS AND HEAT TRANSFER TO DESORB AND REMOVE VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS. THE ORGANIC COMPOUNDS ARE REMOVED BY CONDENSATION, THROUGH CARBON ABSORPTION, OR THROUGH COMBUSTION AND THE AIRSTREAM IS THEN DISCHARGED THROUGH A STACK. PROCESS RESIDUALS INCLUDE PROCESSED WASTE, CONDENSED ORGANIC COMPOUNDS, AN AQUEOUS OFFSTREAM, ASH FROM THE AFTERBURNER, SPENT CARBON AND AIR EMISSIONS (WHICH MAY REQUIRE CONTROLS, AS DISCUSSED IN THE COMPLIANCE WITH ARARS SECTION).

EXCAVATED SOIL WOULD BE PLACED ON TRUCKS, HAULED TO THE ON-SITE LTTD LAYDOWN AREA (0.25 MILES AWAY), PREPROCESSED TO REMOVE ANY LARGE BOULDERS, THEN FED INTO THE LTTD UNIT. THE TREATED SOILS WOULD BE STOCKPILED AND EVENTUALLY REPLACED IN THE ORIGINAL EXCAVATION. TREATMENT OF THE ESTIMATED 14,600 CUBIC YARDS WOULD TAKE APPROXIMATELY 60 TO 90 DAYS AFTER THE SYSTEM IS SET UP. THE ISVE PORTION OF THE REMEDY WOULD REQUIRE AT LEAST 17 EXTRACTION WELLS AND THE DURATION WOULD STILL BE EXPECTED TO EXTEND OVER 12 MONTHS.

THE TOTAL PRESENT NET WORTH OF ALTERNATIVE 3 IS ESTIMATED AT $8.5 MILLION.

ALTERNATIVE 4: IN-SITU VACUUM EXTRACTION, PAINT LAYER REMOVAL, NEW INTERCEPTOR WELL SYSTEM AND CURRENT AIR STRIPPER, DEED RESTRICTIONS, AND GROUND WATER MONITORING

ALTERNATIVE 4 INCORPORATES A NEW INTERCEPTOR WELL SYSTEM ON THE WEST SIDE OF THE WELL FIELD. ALL OTHER COMPONENTS OF THE REMEDY ARE THE SAME AS DESCRIBED IN ALTERNATIVE 2.

CONSTRUCTION OF THE ADDITIONAL INTERCEPTOR WELLS ON THE WEST SIDE WILL CONTAIN, OR BLOCK, THE PLUME AND PREVENT CONTAMINATION FROM ENTERING THE WELL FIELD.

CONSTRUCTION OF THE NEW INTERCEPTOR WELLS ON THE WEST SIDE IS ANTICIPATED TO DECREASE THE AVERAGE DAILY

QUANTITY OF GROUND WATER REQUIRING TREATMENT FROM 4.1 MILLION GALLONS PER DAY (MGD) TO 1.3 - 2.5 MGD, DEPENDING ON WELL FIELD DEMAND. GREATER WELL FIELD DEMAND WOULD REQUIRE GREATER PUMPING OF THE INTERCEPTOR WELLS AS WELL. CONSTRUCTION OF THE NEW INTERCEPTOR WELLS WILL ALSO NECESSITATE THE CONSTRUCTION OF APPROXIMATELY 3,000 LINEAR FEET OF 10-INCH DIAMETER DUCTILE FORCE MAIN FROM THE WEST SIDE INTERCEPTOR WELLS TO THE AIR STRIPPER BUILDING.

INITIALLY, THE EXISTING EAST SIDE INTERCEPTORS, PRODUCTION WELLS AND NEW WEST SIDE INTERCEPTORS WILL BE ROUTED THROUGH THE AIR STRIPPER. WHEN THE PRODUCTION WELLS DECREASE CONCENTRATIONS, ONLY THE EAST AND WEST INTERCEPTORS WILL BE ROUTED TO THE AIR STRIPPER. THIS IS EXPECTED TO TAKE LESS THAN 5 YEARS. AS THE EAST SIDE GROUND WATER CLEANUP STANDARDS ARE ACHIEVED, ONLY THE WEST SIDE INTERCEPTORS WILL BE ROUTED TO THE AIR STRIPPER.

THE AIR STRIPPER WAS DESIGNED FOR AN INFLUENT CONCENTRATION OF 310 PPB AT 6.5 MGD. AT THIS RATE, EMISSIONS DID NOT EXCEED 1 X (10-6) RISK LEVELS, NOR DID IT EXCEED ANY STATE OR FEDERAL STANDARD. THE AIR STRIPPER, TREATING WATER FROM THE EAST AND WEST INTERCEPTOR WELLS, WILL EMIT APPROXIMATELY 2.02 POUNDS/DAY (737 POUNDS/YEAR) OF VOCS. THE CONCENTRATION IN THE INFLUENT WILL INCREASE FROM THE 15 TO 20 PPB CURRENTLY MEASURED TO APPROXIMATELY 200 PPB. THE CONCENTRATION WILL INCREASE BECAUSE THE NEW WESTERN INTERCEPTORS WILL BE LOCATED IN THE MOST CONCENTRATED PORTION OF THE PLUME AND BECAUSE THE EXISTING PRODUCTION WELLS CURRENTLY ROUTED TO THE AIR STRIPPER WILL NO LONGER NEED TO BE ROUTED TO THE AIR STRIPPER. THE COMBINED AIR EMISSIONS FROM BOTH THE AIR STRIPPER AND THE ISVE ARE EXPECTED TO BE LESS THAN THE STATE REGULATED PERMIT AMOUNT OF 25 TONS VOCS/YEAR (326 IAC 8-1-6), THE STATE IMPLEMENTATION PLAN (SIP) REGULATED STANDARDS OF 3 POUNDS/HOUR OR 15 POUNDS/DAY. THEREFORE, EMISSIONS CONTROLS WILL NOT LIKELY BE NEEDED.

DURING THE DESIGN PHASE, ESTIMATES FOR AIR EMISSION MASS AND RATE WILL BE REFINED AND REEVALUATED. THE ESTIMATE FOR NEW INTERCEPTOR CAPACITY WILL BE REFINED AND IF AN INCREASED FLOW IS REQUIRED IN ORDER TO ACHIEVE COMPLETE INTERCEPTION, THE AIR EMISSIONS RATES WILL BE REEVALUATED TO ENSURE THAT ARARS AND PROTECTIVE LEVELS ARE NOT EXCEEDED. AND IF NECESSARY, THE AIR STRIPPER FACILITY WOULD BE MODIFIED TO ACCOMMODATE PROJECTED FLOW CHANGES. SIMILARLY, IF SOIL CONCENTRATIONS OR VOLUME CHANGE SIGNIFICANTLY, AIR EMISSIONS CONTROLS WILL ALSO BE EVALUATED FOR THE ISVE SYSTEM.

THE TOTAL PRESENT NET WORTH OF ALTERNATIVE 4 IS ESTIMATED AT $3.4 MILLION.

ALTERNATIVE 5: LOW TEMPERATURE THERMAL DESORPTION, IN-SITU VACUUM EXTRACTION, PAINT LAYER REMOVAL, NEW INTERCEPTOR WELL SYSTEM, CURRENT AIR STRIPPER, DEED RESTRICTIONS, AND GROUND WATER MONITORING

ALTERNATIVE 5 COMBINES THE WEST SIDE GROUND WATER INTERCEPTION SYSTEM DESCRIBED IN ALTERNATIVE 4 WITH THE LTTD CONTAMINATED SOILS REMEDIATION APPROACH IDENTIFIED IN ALTERNATIVE 3.

THE TOTAL PRESENT NET WORTH OF ALTERNATIVE 5 IS $8.1 MILLION.

#COA
COMPARISON OF ALTERNATIVES:

TABLE 7 SUMMARIZES THE ALTERNATIVES RELATIVE TO THE 9 CRITERIA.

THRESHOLD CRITERIA:

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT:

ALTERNATIVE 1, NO ACTION, DOES NOT SATISFY THE REQUIREMENT FOR OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT BECAUSE THE RISKS POSED BY CONTAMINATED SOILS AND GROUND WATER WOULD REMAIN. ALTERNATIVES 2, 3, 4 AND 5 ARE ALL PROTECTIVE SINCE THEY EACH INCLUDE TREATMENT OF CONTAMINATED SOIL AND GROUND WATER. ALTERNATIVES 2 AND 3 ARE PROTECTIVE IN THAT THE VOC CONTAMINATION IS INTERCEPTED BY THE PRODUCTION WELLS AND TREATED BY THE AIR STRIPPER. HOWEVER, THE CONCENTRATIONS ARE MORE DILUTE AND THE WELL FIELD ITSELF IS NOT RESTORED. ALTERNATIVES 4 AND 5 ARE CONSIDERED MORE PROTECTIVE DUE TO THE PLUME CONTAINMENT OUTSIDE OF THE WELL FIELD. THE NET RESULT IS THAT THE WELL FIELD IS RESTORED WITHIN A RELATIVELY SHORT TIMEFRAME (A FEW YEARS OR LESS).

COMPLIANCE WITH ARARS:

SECTION 121(D) OF SARA REQUIRES THAT REMEDIAL ACTIONS MEET LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) OF OTHER ENVIRONMENTAL LAWS. THESE LAWS MAY INCLUDE: THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), THE CLEAN WATER ACT (CWA), THE CLEAN AIR ACT (CAA), THE SAFE DRINKING WATER ACT (SDWA),

AND ANY STATE LAW WHICH HAS MORE STRINGENT REQUIREMENTS THAN THE CORRESPONDING FEDERAL LAW. "LEGALLY APPLICABLE" REQUIREMENTS ARE THOSE CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE ENVIRONMENTAL PROTECTION REQUIREMENTS, CRITERIA OR LIMITATIONS PROMULGATED UNDER FEDERAL OR STATE LAW THAT SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCES AT A CERCLA SITE. "RELEVANT AND APPROPRIATE" REQUIREMENTS ARE THOSE REQUIREMENTS THAT, WHILE NOT LEGALLY APPLICABLE TO THE REMEDIAL ACTION, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE SITE THAT THEIR USE IS WELL SUITED TO THE REMEDIAL ACTION.

NON-PROMULGATED ADVISORIES OR GUIDANCE DOCUMENTS ISSUED BY FEDERAL OR STATE GOVERNMENTS DO NOT HAVE THE STATUS OF ARARS; HOWEVER, WHERE NO APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS EXIST, OR FOR SOME REASON MAY NOT BE SUFFICIENTLY PROTECTIVE, NON-PROMULGATED ADVISORIES OR GUIDANCE DOCUMENTS MAY BE CONSIDERED IN DETERMINING THE NECESSARY LEVEL OF CLEANUP FOR THE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

TABLE 9 PROVIDES A SUMMARY OF ARARS AND OTHER PERTINENT LAWS AND REGULATIONS FOR THE ALTERNATIVES. BELOW, HOWEVER, IS A DISCUSSION OF THE SIGNIFICANT ARARS FOR THE RESPECTIVE ALTERNATIVES.

RCRA IS A SIGNIFICANT ARAR FOR THIS OPERABLE UNIT. CHLORINATED SOLVENTS WERE DISPOSED OF AT THE SITE PRIOR TO 1980, BUT THE TCE AND OTHER SOLVENTS CAME FROM DEGREASING OPERATIONS (RCRA LISTED PROCESSES). THEREFORE, RCRA IS APPLICABLE. IN ADDITION, ANY SOLID WASTE DERIVED FROM THE TREATMENT, STORAGE OR DISPOSAL OF A LISTED RCRA HAZARDOUS WASTE IS ITSELF A LISTED HAZARDOUS WASTE. THEREFORE, BOTH PRIOR AND SUBSEQUENT TO TREATMENT, THE SOILS ARE CONSIDERED RCRA LISTED HAZARDOUS WASTES. THE SOIL AND GROUND WATER ARE ALSO RCRA LISTED WASTES UNDER THE "CONTAINED-IN" RULE. UNDER THIS RULE, ANY MIXTURE OF A NON-HAZARDOUS MATERIAL WITH A RCRA LISTED HAZARDOUS WASTE MUST BE MANAGED AS A HAZARDOUS WASTE AS LONG AS THE MATERIAL "CONTAINS" HAZARDOUS WASTE.

THE PAINT LAYER WILL BE REMOVED AND DISPOSED OF OFF-SITE. THIS LAYER CONSISTS OF SOIL CONTAMINATED WITH RCRA LISTED HAZARDOUS WASTE AND, THEREFORE, RCRA LAND DISPOSAL RESTRICTIONS (LDRS) APPLY TO ITS DISPOSAL. BECAUSE THE LDR TREATMENT STANDARDS ARE BASED ON THE TREATMENT OF INDUSTRIAL PROCESS WASTES THAT ARE PHYSICALLY AND CHEMICALLY LESS COMPLEX THAN PROCESS WASTES MIXED WITH SOIL, UNTIL TREATMENT STANDARDS FOR SOIL AND DEBRIS ARE PROMULGATED, THERE IS A PRESUMPTION THAT A TREATABILITY VARIANCE PURSUANT TO 40 CFR 268.44 WILL BE USED TO COMPLY WITH THE LDRS. (SEE SUPERFUND LDR GUIDANCE #6A, OSWER DIRECTIVE #9347.3-06FS, SEPTEMBER 1990).

THE GUIDANCE DEMONSTRATES THAT, BASED ON THEIR PHYSICAL AND CHEMICAL PROPERTIES, RCRA HAZARDOUS CONSTITUENTS HAVE BEEN DIVIDED INTO TWELVE "STRUCTURAL FUNCTIONAL GROUPS", AS PROVIDED IN TABLE 8. EACH CONSTITUENT IN A GROUP IS TREATED IN RELATION TO A THRESHOLD CONCENTRATION (TC) (COLUMN 3 OF TABLE 8). IF THE CONSTITUENT CONCENTRATION IS BELOW THE TC, THEN THE WASTE IS TREATED TO A LEVEL WITHIN A SPECIFIC CONCENTRATION RANGE (COLUMN 2 OF TABLE 8). IF THE CONSTITUENT CONCENTRATION EXCEEDS THE TC, THEN THE WASTE IS TREATED TO A LEVEL SPECIFIED IN TERMS OF PERCENT REDUCTION (COLUMN 4 OF TABLE 8).

SAMPLING OF THE PAINT LAYER INDICATED THE PRESENCE OF TCE, XYLENE AND LEAD. THE SAMPLING DATA, HOWEVER, WAS LIMITED AND ADDITIONAL CHARACTERIZATION OF THE PAINT LAYER WILL BE REQUIRED IN THE DESIGN PHASE IN ORDER TO DETERMINE THE PRESENCE OF ADDITIONAL FUNCTIONAL GROUPS. IT IS EXPECTED THAT, AT A MINIMUM, HALOGENATED ALIPHATICS (E.G., TCE), HALOGENATED NON-POLAR AROMATICS (E.G., XYLENE) AND LEAD WILL BE AMONGST THE FUNCTIONAL GROUPS USED TO DETERMINE TREATMENT STANDARDS AND TECHNOLOGIES.

USING THE LIMITED DATA AVAILABLE FROM SAMPLING OF THE PAINT LAYER, THE TREATABILITY VARIANCE WOULD BE APPLIED AS FOLLOWS:

	CONSTITUENT CONCENTRATION	TC	TREATMENT LEVEL
TCE	88 PPM	40 PPM	95-99.9 PERCENT RED.
XYLENE	2,300 PPM	100 PPM	90-99.9 PERCENT RED.

(LEAD WAS NOT MEASURED BY TCLP, SO IT IS NOT USED IN THIS EXAMPLE.)

THE PAINT LAYER WILL BE REMOVED, SAMPLED FOR THE FULL TARGET COMPOUND LIST AND, BASED UPON THE RESULTS OF THAT SAMPLING, IT WILL BE TAKEN TO A FACILITY CAPABLE OF THE TREATMENT TECHNOLOGIES AND TREATMENT STANDARDS IDENTIFIED IN TABLE 8 FOR DISPOSAL. SHOULD THE CONSTITUENT CONCENTRATIONS BE MEASURED AT LESS THAN THE CONCENTRATION RANGE PROVIDED IN COLUMN 2 OF TABLE 8 PRIOR TO ANY TREATMENT, NO TREATMENT WILL BE NECESSARY PRIOR TO DISPOSAL IN A RCRA SUBTITLE C FACILITY.

THE AGENCY INTENDS TO GRANT A TREATABILITY VARIANCE FOR THE PAINT LAYER UNDER 40 CFR 268.44 TO COMPLY WITH

RCRA LDRS UNLESS PUBLIC COMMENT FOLLOWING RELEASE OF THIS ROD OVERCOMES THE PRESUMPTION THAT A TREATABILITY VARIANCE IS APPROPRIATE FOR THIS WASTE.

SINCE PAINT LAYER REMOVAL IS REQUIRED FOR ALTERNATIVES 2 THROUGH 4, THE ABOVE ANALYSIS APPLIES TO ALL ALTERNATIVES EXCEPT NO ACTION.

WITH THE USE OF LTTD, THE EXCAVATION AND MOVEMENT OF THESE SOILS FROM THEIR CURRENT LOCATION FOR TREATMENT AND REPLACEMENT/REDISPOSAL AT THE SAME LOCATION WILL TRIGGER THE APPLICABILITY OF RCRA LDRS. THE TREATED SOILS WILL STILL BE RCRA LISTED WASTES BECAUSE ANY SOLID WASTE DERIVED FROM THE TREATMENT, STORAGE OR DISPOSAL OF THE RCRA LISTED WASTE IS A RCRA LISTED WASTE. LTTD TREATMENT OF THE SOILS, HOWEVER, WOULD MEET THE LDR TREATMENT STANDARDS FOR TCE UNDER 40 CFR PART 268, SUBPART D AND, THEREFORE, COULD BE DISPOSED OF AT THE LOCATION FROM WHICH THEY WERE REMOVED.

THE HAZARDOUS AND SOLD WASTE AMENDMENTS OF 1984 (HSWA) ESTABLISHED MINIMUM TECHNOLOGY REQUIREMENTS FOR DISPOSAL OF RCRA HAZARDOUS WASTES INTO NEW LAND DISPOSAL UNITS. THESE TECHNOLOGY REQUIREMENTS WOULD NOT BE TRIGGERED UPON REDISPOSAL/REPLACEMENT OF THE LTTD-TREATED SOILS BECAUSE NO "NEW" UNIT WOULD BE CREATED.

RCRA CLOSURE REQUIREMENTS AT 40 CFR PART 264, HOWEVER, WOULD BE TRIGGERED BY THE REPLACEMENT OF THE SOILS INTO THE PRE-EXISTING UNIT. IMPLEMENTABILITY OF RCRA CLOSURE WOULD BE VERY DIFFICULT DUE TO THE LARGE VOLUME OF SOIL AND RESTRICTED SPACE AT THE SITE. UNDER THIS SCENARIO, THE AGENCY WOULD BE LIKELY TO CONSIDER EITHER DE-LISTING THE WASTE.

THIS LTTD ARAR ANALYSIS APPLIES TO ALTERNATIVES 3 AND 5.

RCRA LDR TREATMENT STANDARDS DO NOT APPLY TO SOIL TREATED IN-SITU. RCRA LDRS WILL NOT BE TRIGGERED BY ALTERNATIVES 2 AND 4. RCRA REGULATES AIR EMISSIONS FROM PROCESS VENTS AT 40 CFR 264 SUBPART AA. THESE REGULATIONS ARE NEITHER APPLICABLE NOR RELEVANT AND APPROPRIATE BECAUSE CERCLA WASTE MANAGEMENT ACTIVITIES ARE CONSIDERED, AS A GROUP, TO BE FUNDAMENTALLY DIFFERENT THAN THOSE RCRA REGULATED HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITIES FOR WHICH THE SUBPART AA REGULATIONS ARE APPLICABLE. SEE 55 FED. REG. 25458, 25459 (JUNE 21, 1990).

BOTH THE ISVE SYSTEM AND THE AIR STRIPPER PRODUCE EMISSIONS SUBJECT TO REGULATION UNDER THE CLEAN AIR ACT (CAA). UNDER THE CAA, EPA HAS PROMULGATED NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS), NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) AND NEW SOURCE PERFORMANCE STANDARDS (NSPS).

NAAQS HAVE BEEN PROMULGATED PURSUANT TO SECTION 109 OF THE CAA FOR PARTICULATE MATTER AND OZONE FROM "MAJOR" SOURCES. STATES TRANSLATE THESE AMBIENT STANDARDS INTO SOURCE-SPECIFIC EMISSION LIMITATIONS IN STATE IMPLEMENTATION PLANS (SIPS), UNDER WHICH THE STATE HAS THE PRIMARY RESPONSIBILITY FOR ASSURING THAT ANY NEW SOURCE WITH A POTENTIAL OF EMITTING 25 TONS OF VOCS PER YEAR MUST BE USED IN CONJUNCTION WITH THE BEST AVAILABLE CONTROL DEVICE TO REDUCE EMISSIONS. NEITHER ISVE NOR THE AIR STRIPPER CONSTITUTE A "MAJOR SOURCE" UNDER THE CAA. UNDER IDEM'S SIP (APC-19, FEBRUARY 16, 1982) AND UNDER 326 IAC-2-1-1(B)(2)(D), REGISTRATION IS REQUIRED FOR VOC AIR EMISSIONS WHICH HAVE THE POTENTIAL TO EXCEED 3 POUNDS/HOUR OR 15 POUNDS/DAY, BUT DO NOT HAVE THE POTENTIAL FOR EMITTING 25 TONS/YEAR. SUCH REGISTRATION REQUIREMENTS MAY RESULT IN THE USE OF EMISSIONS CONTROLS ON SOURCES WHICH EXCEED THESE LIMITS. IT IS ANTICIPATED THAT IMPLEMENTATION OF ANY TREATMENT ALTERNATIVE WOULD FALL BELOW THESE EMISSION STANDARDS. HOWEVER, SUCH ESTIMATES WILL BE VERIFIED IN THE DESIGN PHASE AND CONTROLS WILL BE USED IF REQUIRED.

POLLUTANTS FOR WHICH NO NAAQS EXIST, BUT THAT CAUSE OR CONTRIBUTE TO AIR POLLUTION THAT MAY RESULT IN SERIOUS ILLNESS HAVE BEEN IDENTIFIED BY EPA UNDER THE CAA SUBSECTION 112 AND ARE CALLED NESHAPS. THE ONLY POLLUTANT AT THIS SITE FOR WHICH A NESHAPS EXISTS IS VINYL CHLORIDE. SEE 40 CFR PART 61, SUBPART F. THE EMISSION STANDARD FOR VINYL CHLORIDE PLANTS IS 10 PPM. WHILE THIS STANDARD IS NOT APPLICABLE BECAUSE NONE OF THE TREATMENT TECHNOLOGIES MEETS THE DEFINITION OF A VINYL CHLORIDE PLANT, IT IS RELEVANT AND APPROPRIATE. ALL TREATMENT ALTERNATIVES WILL SATISFY THIS REQUIREMENT, PARTICULARLY SINCE THE AMOUNT OF VINYL CHLORIDE AT THE SITE IS VERY LOW.

THE NSPS ARE TECHNOLOGY-BASED STANDARDS WHICH ARE NEITHER APPLICABLE NOR APPROPRIATE TO THE POLLUTANTS AND CHEMICALS AT THIS SITE.

ALTERNATIVES 4 AND 5 REQUIRE CONSTRUCTION OF A WATER MAIN ACROSS CHRISTIANA CREEK. THEREFORE, THESE ALTERNATIVES MUST ASSURE NO LOSS OF FLOODPLAIN OR WETLAND AREA IN ACCORDANCE WITH EXECUTIVE ORDERS 11988 AND 11990.

THE SDWA REQUIRES THE ESTABLISHMENT OF STANDARDS TO PROTECT HUMAN HEALTH FROM CONTAMINANTS IN DRINKING WATER.

MAXIMUM CONTAMINANT LEVELS (MCLS) FOR SPECIFIC CONTAMINANTS HAVE BEEN PROMULGATED UNDER SDWA. ADDITIONALLY, SDWA MAXIMUM CONTAMINANT LEVEL GOALS (MCLGS), WHICH ARE NON-ENFORCEABLE HEALTH-BASED GOALS, HAVE BEEN SET AT LEVELS AT WHICH NO KNOWN OR ANTICIPATED ADVERSE EFFECTS ON THE HEALTH OF PERSONS IS LIKELY TO OCCUR. THE NCP REQUIRES THAT NON-ZERO MCLGS SHALL BE ATTAINED BY REMEDIAL ACTIONS FOR WATER THAT ARE CURRENT OR POTENTIAL SOURCES OF DRINKING WATER, WHERE MCLGS ARE RELEVANT AND APPROPRIATE. SEE 40 CFR 300.430(E)(2)(I)(B). MORE STRINGENT STANDARDS THAN MCLS MAY BE APPROPRIATE FOR GROUND WATER USED AS DRINKING WATER WHEN MULTIPLE CONTAMINANTS AND/OR MULTIPLE EXPOSURE PATHWAYS MAY NOT BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. GROUND WATER CLEANUP STANDARDS FOR THIS SITE HAVE BEEN SET LOWER THAN THE MCLS IN ORDER TO ACHIEVE A RESIDUAL RISK LEVEL OF 1 X (10-5) ACROSS ALL MEDIA. SEE THE DETAILED DESCRIPTION OF THE SELECTED REMEDY FOR EXPLANATION OF THE GROUND WATER STANDARDS.

BALANCING CRITERIA:

SHORT-TERM EFFECTIVENESS:

THIS EVALUATION CRITERION ADDRESSES THE EFFECTS OF THE ALTERNATIVES ON HUMAN HEALTH AND THE ENVIRONMENT DURING CONSTRUCTION AND IMPLEMENTATION. ALL OF THE ALTERNATIVES, WITH THE EXCEPTION OF NO ACTION, INVOLVE EXCAVATION AND OFF-SITE TREATMENT/DISPOSAL OF THE PAINT LAYER WASTE, AS WELL AS TREATMENT OF CONTAMINATED GROUND WATER IN THE EXISTING AIR STRIPPER. ALTERNATIVES 3 AND 5 WOULD HAVE SIGNIFICANTLY GREATER SHORT-TERM IMPACTS THAN ALTERNATIVES 2 AND 4, SUCH AS EXCAVATION RELATED DUST, HANDLING OF CONTAMINATED SOILS AND DISRUPTION OF EXISTING BUSINESSES. IN ADDITION, EXCAVATION OF SOIL NEAR THE BUILDINGS WOULD REQUIRE BRACING AND BUILDING SUPPORT. THEREFORE, ALTERNATIVES 2 AND 4 WOULD HAVE LESS SHORT TERM ADVERSE IMPACTS.

LONG-TERM EFFECTIVENESS AND PERMANENCE:

THE EVALUATION OF ALTERNATIVES UNDER THIS CRITERION ADDRESS THE RISK REMAINING AT THE MSWF SITE AT THE CONCLUSION OF REMEDIAL ACTIONS. THE NO-ACTION ALTERNATIVE PROVIDES NO LONG-TERM EFFECTIVENESS AND WOULD RESULT IN CONTINUATION OF THE ELEVATED (10-4) RISK LEVELS THAT CURRENTLY EXIST. THE TWO TREATMENT TECHNOLOGIES CONSIDERED IN ALTERNATIVES 2 THROUGH 5, ISVE AND LTTD, ARE RADICALLY DIFFERENT IN THEIR APPROACH, BUT ARE CAPABLE OF ACHIEVING THE SAME CLEANUP STANDARDS.

IN EVALUATING THE TIME REQUIRED UNTIL REMEDIAL ACTION OBJECTIVES ARE MET, CONSIDERATION SHOULD BE GIVEN TO THE TIME NECESSARY TO REMEDIATE INDIVIDUAL ELEMENTS OF THE ALTERNATIVES AS WELL AS THE ENTIRE SITE. FOR THE MSWF SITE, IT IS IMPOSSIBLE TO QUANTITATIVELY PROJECT THE PRECISE DURATION OF THE PUMP AND TREAT ELEMENT OF THE VARIOUS ALTERNATIVES DUE TO THE COMPLEX INTERDEPENDENCE BETWEEN THE SOILS AND GROUND WATER. HOWEVER, QUALITATIVELY SEVERAL CONCLUSIONS PERTAINING TO DURATION OF GROUND WATER CLEANUP CAN BE DRAWN. FIRST, THE NO ACTION ALTERNATIVE WOULD RESULT IN THE INDEFINITE, AND PERHAPS PERPETUAL, CONTAMINATION OF THE MSWF AQUIFER. ALTERNATIVES 2 AND 3 WILL RESULT IN CLEANUP OF THE EAST SIDE AQUIFER PORTION IN APPROXIMATELY 5 TO 10 YEARS, BUT THE WELL FIELD WILL REMAIN CONTAMINATED. SHOULD CONTAMINANTS OTHER THAN VOCS BECOME A FUTURE PROBLEM, THERE WOULD BE NO CONTAINMENT BEFORE AFFECTING THE WELL FIELD, AT WHICH POINT THE COST OF TREATING A MORE DILUTE, HIGHER VOLUME PROBLEM WOULD BE EXPENSIVE. ALTERNATIVES 4 AND 5 PROVIDE FOR PLUME CONTAINMENT BEFORE REACHING THE WELL FIELD, THUS ALLOWING WELL FIELD RESTORATION WITHIN A FEW YEARS.

REDUCTION OF TOXICITY, MOBILITY AND VOLUME:

THIS EVALUATION CRITERION ADDRESSES THE STATUTORY PREFERENCE FOR SELECTING REMEDIAL ACTIONS THAT EMPLOY TREATMENT TECHNOLOGIES THAT PERMANENTLY REDUCE TOXICITY, MOBILITY OR VOLUME OF THE UNTREATED WASTE. THE NO-ACTION ALTERNATIVE PROVIDES NO REDUCTION OF CONTAMINANT TOXICITY, MOBILITY OR VOLUME. ALTERNATIVES 2 THROUGH 5 REQUIRE REMOVAL OF THE PAINT LAYER. COMPLIANCE WITH THE SOIL AND DEBRIS VARIANCE WILL DICTATE THE TYPE OF RCRA FACILITY WHICH WILL BE ACCEPTABLE FOR TREATMENT AND/OR DISPOSAL.

BOTH ISVE AND LTTD WILL REDUCE THE VOCS CONTAMINATION IN THE SOIL, THEREBY PERMANENTLY REDUCING THE TOXICITY AND VOLUME IN THE SOIL. ISVE WOULD BE CAPABLE OF TREATING THE VOCS TO THE CLEANUP STANDARDS IN-SITU WITH AN EFFICIENCY OF APPROXIMATELY 99.4 PERCENT. IT IS ESTIMATED THAT UP TO 1,000 POUNDS OF VOCS MAY BE EXTRACTED FROM THE SOIL. THE LTTD REMOVAL WOULD ACHIEVE APPROXIMATELY A 99.99 PERCENT REDUCTION IN VOCS OF THE TREATED SOIL. IN COMBINATION WITH GROUND WATER TREATMENT, THE TREATMENT EFFICIENCY OF EITHER TECHNOLOGY WILL ACHIEVE THE VOC STANDARDS SET BY THIS ROD.

GROUND WATER TREATMENT CAN ADDRESS CONTAMINANT MOBILITY. THE WELL FIELD IS NOT A PERFECT HYDRAULIC CONTAINMENT SYSTEM IN THAT CONTAMINATED GROUND WATER DOES ESCAPE THE CAPTURE ZONE AND FLOW SOUTH BEYOND THE WELL FIELD. ALTERNATIVES 4 AND 5 WHICH INCLUDE WEST SIDE INTERCEPTORS, WOULD NOT ONLY PREVENT CONTAMINANT MIGRATION INTO THE WELL FIELD, BUT BEYOND THAT TOWARD THE ST. JOSEPH RIVER AS WELL. ALTERNATIVES 1, 2 AND 3 WOULD ALLOW THE CONTAMINANT MIGRATION TO CONTINUE TO THE WELL FIELD AND BEYOND TO THE RIVER.

IMPLEMENTABILITY:

THIS CRITERION ADDRESSES THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF IMPLEMENTING AN ALTERNATIVE, AND THE AVAILABILITY OF VARIOUS SERVICES AND MATERIALS REQUIRED FOR ITS IMPLEMENTATION. THE TECHNOLOGIES CONSIDERED, WHICH INCLUDE LTTD AND ISVE, ARE AVAILABLE FROM COMMERCIAL VENDORS. HOWEVER, SITE LIMITATIONS INCLUDING CONFINED WORKING AREAS IN CLOSE PROXIMITY TO RESIDENTIAL AREAS AT THE TREATMENT SITE AND GENERAL DISRUPTION MAKE IMPLEMENTATION OF LTTD FAR MORE DIFFICULT THAN THE ISVE SOIL TREATMENT ALTERNATIVE. SOIL TREATED BY LTTD WOULD REQUIRE DELISTING OR AN ARAR WAIVER PRIOR TO REPLACEMENT ON-SITE. LTTD ONCE MOBILIZED, MUST BE USED TO THE FULLEST EXTENT AT THAT TIME SINCE REMOBILIZATION IS COSTLY AND NOT AS FLEXIBLE. ISVE IS MORE FLEXIBLE IN THAT IT CAN BE READILY EXPANDED AND CAN BE ADAPTED TO OTHER AREAS IF NECESSARY.

THE AIR STRIPPER IS ALREADY ON-LINE AND PERFORMING AS DESIGNED. THE ADDITIONAL INTERCEPTOR WELLS ON THE WEST SIDE ARE READILY IMPLEMENTABLE.

COST:

ALTERNATIVES ARE EVALUATED FOR COST IN TERMS OF CAPITAL COSTS, OPERATION AND MAINTENANCE COST (O&M), AND PRESENT WORTH COST. THE PRESENT WORTH ANALYSIS IS USED TO EVALUATE EXPENDITURES THAT OCCUR OVER DIFFERENT TIME PERIODS BY DISCOUNTING ALL FUTURE COSTS TO A COMMON BASE YEAR. FOR COST PURPOSES OF THIS PROJECT, 40 YEARS HAS BEEN ASSUMED. THIS IS SLIGHTLY OVER THE STANDARD 30 YEAR PROJECTION BECAUSE PUMPING OF THE INTERCEPTORS ON THE WEST SIDE AND TREATMENT VIA THE AIR STRIPPER WOULD BE REQUIRED UNTIL THE SOURCES ARE IDENTIFIED AND CONTROLLED OR UNTIL THEY DIMINISH THROUGH NATURAL PROCESSES - AN UNDEFINED TIMEFRAME. AS THE WELL FIELD AND EAST SIDE AQUIFER AREA IS RESTORED, FLOW TO THE AIR STRIPPER WILL BE REDUCED AND OPERATION AND MAINTENANCE (O&M) COSTS WILL BE REDUCED. THE COSTS ASSUMPTIONS FOR WEST SIDE INTERCEPTORS REMAINS THE SAME FOR BOTH ALTERNATIVES 4 AND 5.

COST ESTIMATES FOR THE PAINT LAYER REMOVAL ASSUME OFF-SITE INCINERATION. THIS IS A RELATIVELY HIGH COST PER SOIL VOLUME ALTERNATIVE RELATIVE TO THE ISVE COST PER SOIL VOLUME. COST ASSUMPTIONS FOR THIS ELEMENT OF THE REMEDY ARE THE SAME FOR ALL ALTERNATIVES. DUE TO THE UNCERTAINTY IN EXTENT OF CONTAMINATION BENEATH THE BUILDINGS, THE FEASIBILITY STUDY COSTS ARE CONSIDERED LOWER BOUND ESTIMATES.

ALTERNATIVES WHICH INCLUDE LTTD (3 AND 5) ARE MORE COSTLY THAN THOSE WHICH RELY ON ISVE EXCLUSIVELY (2 AND 4). OF THE ALTERNATIVES WHICH INCLUDE WEST SIDE INTERCEPTORS (4 AND 5), ALTERNATIVE 4 IS LESS COSTLY. CAPITAL, OPERATION AND MAINTENANCE AND PRESENT WORTH COSTS ARE SUMMARIZED AT THE BOTTOM OF TABLE 7.

MODIFYING CRITERIA:

STATE ACCEPTANCE:

IDEM HAS BEEN INVOLVED THROUGHOUT THIS RI/FS AND SUPPORTS THE SELECTED REMEDY.

COMMUNITY ACCEPTANCE:

COMMUNITY ACCEPTANCE OF THE SELECTED REMEDY IS DISCUSSED IN THE RESPONSIVENESS SUMMARY ATTACHED.

#SR
THE SELECTED REMEDY

THE SELECTED REMEDY WILL REDUCE THE THREAT FROM CONTAMINANTS AT THE SITE SUCH THAT THE TOTAL EXCESS CUMULATIVE CARCINOGENIC RISK FROM EXPOSURE TO ALL MEDIA DO NOT EXCEED 1 X (10-5).

BASED ON THE RI/FS, AND USING THE COMPARATIVE ANALYSIS OF ALTERNATIVES DESCRIBED ABOVE, USEPA HAS SELECTED ALTERNATIVE 4 AS THE MOST APPROPRIATE REMEDIAL ACTION AT THE MSWF SITE. IDEM HAS CONCURRED WITH SELECTION OF ALTERNATIVE 4. A FLOW CHART AND CONCEPTUAL SITE DIAGRAM ARE SHOWN IN FIGURES 8 AND 9 RESPECTIVELY.

COMPONENTS:

* IMPLEMENT ISVE FOR THE TREATMENT OF VOCS IN THE CONTAMINATED SOILS IN THE EAST SIDE HOT SPOTS.

* EXCAVATE AND TREAT AND/OR DISPOSE OF THE CONTAMINATED SOILS ASSOCIATED WITH THE IDENTIFIED PAINT LAYER SOURCE AREA(S) AT AN OFF-SITE FACILITY IN COMPLIANCE WITH STATE

AND FEDERAL REGULATIONS.

* CONSTRUCT NEW INTERCEPTOR WELLS (I-3 AND I-4) TO THE WEST OF THE WELL FIELD TO CONTAIN THE PLUME, CONSTRUCT A NEW FORCE MAIN TO CONNECT THE NEW INTERCEPTORS TO THE AIR STRIPPER, MAINTAIN THE AIR STRIPPER AND ITS ANCILLARY SUPPORT SYSTEM AND MONITOR.

* PLACE DEED RESTRICTIONS ON THE INSTALLATION AND USE OF POTABLE WATER SUPPLY WELLS ON THE EAST SIDE PROPERTIES UNTIL SOIL AND GROUND WATER GOALS ARE MET AND SUSTAINED.

* IMPLEMENT A GROUND WATER MONITORING PROGRAM TO DEMONSTRATE COMPLIANCE WITH THE CLEANUP STANDARDS.

RATIONALE:

ALL ALTERNATIVES, EXCEPT NO-ACTION, ARE PROTECTIVE AND COMPLY WITH ARARS. THEREFORE, ALTERNATIVES 2 THROUGH 5 PASS THE THRESHOLD CRITERIA. OF THE ALTERNATIVES INVOLVING TREATMENT, THE ISVE ALTERNATIVES 2 AND 4, ARE LESS COSTLY THAN 3 AND 5 FOR THE SAME LEVEL OF PERFORMANCE AS MEASURED BY THEIR ABILITY TO ACHIEVE THE CLEANUP STANDARDS. ISVE REQUIRES LESS DISRUPTION TO BUSINESSES AND COMMUNITY FOR IMPLEMENTATION AND IS MORE FLEXIBLE IN THAT IT CAN BE READILY EXPANDED ON-SITE. GIVEN THAT, THERE IS NO INHERENT ADVANTAGE IN USE OF THE LTTD TECHNOLOGY AT THIS SITE.

ALTERNATIVES 2 AND 4 DIFFER IN THEIR INCLUSION OF WEST SIDE INTERCEPTORS. UNDER ALTERNATIVE 2, CONTAMINATED GROUND WATER CONTINUES TO BE DRAWN INTO THE WELL FIELD. ALTHOUGH SEVERAL PRODUCTION WELLS ARE ROUTED TO THE AIR STRIPPER, THE INFLUENT CONCENTRATION TO THE AIR STRIPPER IS LOW. FOR THE SAME, IF NOT LOWER OPERATING COST, A LOWER INFLUENT FLOW WITH A HIGHER CONTAMINANT CONCENTRATION COULD BE ACHIEVED WHILE AT THE SAME TIME PREVENTING CONTINUED CONTAMINATION OF THE WELL FIELD. SINCE HOT SPOT AREAS OF CONTAMINATION ON THE WEST SIDE HAVE NOT BEEN IDENTIFIED, IT IS UNKNOWN HOW LONG THIS CONTAMINATION WILL CONTINUE. IN ADDITION, THE LOCATION OF THE WELL FIELD IN AN INDUSTRIAL AREA MAKES IT VULNERABLE TO FUTURE CONTAMINATION WITH VERY LITTLE RESPONSE TIME SHOULD OTHER CONTAMINATION PROBLEMS DEVELOP. THUS, WEST SIDE INTERCEPTION WELLS PROVIDE GREATER LONG TERM PROTECTION. THE MSWF STUDY AREA CONSTITUTES A CLASS 2A, CURRENT USE AQUIFER. PLUME INTERCEPTION IS CONSISTENT WITH THE AGENCY'S INTENT TO RESTORE AQUIFERS TO THEIR HIGHEST BENEFICIAL USE IN A REASONABLE TIMEFRAME. FOR THESE REASONS, ALTERNATIVE 4 IS SELECTED AS THE MOST PROTECTIVE AND COST-EFFECTIVE REMEDY.

DESCRIPTION:

A MINIMUM SOIL ESTIMATE FOR VAPOR EXTRACTION IS 22,000 CUBIC YARDS. VOLUME ESTIMATES WILL BE REFINED IN THE DESIGN PHASE. ISVE IS EASIER TO IMPLEMENT AND DOES NOT TRIGGER RCRA LDRS BECAUSE THE WASTE IS TREATED IN-SITU. THE PAINT LAYER IS CONSIDERED A LISTED WASTE UNDER THE RCRA DERIVED-FROM RULE. ADDITIONAL CHARACTERIZATION WILL BE REQUIRED DURING THE DESIGN PHASE. WITH HIGH CONCENTRATION OF XYLENE AND LEAD, THIS WASTE MAY ALSO BE RCRA CHARACTERISTIC. THE PAINT LAYER VOLUME IS ESTIMATED AT 60 CUBIC YARDS, ASSUMING THE DISPOSAL AREA IDENTIFIED BENEATH THE BUILDING RECEIVED THE SAME WASTE STREAMS AS THE DISPOSAL AREA OUTSIDE THE BUILDING. ISVE IS NOT A SEPARATION TECHNOLOGY FOR MIXTURES AND WILL NOT BE ABLE TO TREAT THIS WASTE STREAM. LEAVING THE PAINT LAYER WASTE IN PLACE WOULD FAIL TO SATISFY RCRA CLOSURE REQUIREMENTS, WOULD NOT MEET THE CLEANUP STANDARDS, NOR WOULD IT PROVIDE LONG TERM PROTECTION. THEREFORE, IT WILL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH RCRA.

THE EXISTING AIR STRIPPER DOES NOT HAVE AIR EMISSIONS CONTROLS ON IT. EXISTING AIR EMISSIONS DO NOT EXCEED RISK LEVELS AT DESIGN CONCENTRATIONS AND EMISSIONS RATES. THIS REMEDY, INCLUDING HIGHER INFLUENT CONCENTRATION AS A RESULT OF THE WEST SIDE INTERCEPTORS, AND ISVE, IS STILL NOT ANTICIPATED TO EXCEED THE 3 POUNDS/HOUR, 15 POUNDS/DAY OR 25 TONS/YEAR AIR EMISSIONS STANDARDS.

THE REMEDIAL ACTION OBJECTIVES ARE TRANSLATED INTO CLEANUP LEVELS FOR SOIL, GROUND WATER AND AIR AS FOLLOWS:

CLEANUP STANDARDS FOR THE SOIL, GROUND WATER AND AIR ON THE EAST SIDE ARE SELECTED AT A 1 X (10-5) LEVEL BASED ON POTENTIAL FUTURE USE. THE 1 X (10-5) LEVEL IS VERY CLOSE TO STANDARD ANALYTICAL DETECTION LIMITS FOR GROUND WATER, THEREFORE, ITS ACHIEVEMENT CAN BE RELIABLY MEASURED. AT THIS CLEANUP LEVEL, THE SOIL REMEDIATION IS EXPECTED TO ACHIEVE GROUND WATER PROTECTION IN THE (10-8) RANGE AS A SINGLE PATHWAY, PREVENT SOILS FROM FURTHER CONTRIBUTING TO GROUND WATER CONTAMINATION AND IS ACHIEVABLE WITH THE SELECTED TECHNOLOGY. THE FOLLOWING TABLE SHOWS THE RANGE FROM WHICH THE CLEANUP STANDARDS WERE SELECTED.

GROUND WATER (PPB)

	CURRENT WORKER			FUTURE RESIDENT		
	(10-4)	(10-5)	(10-6)	(10-4)	(10-5)	(10-6)
TCE	10	1.0	0.1	10	1.0	0.1
PCE	5	0.5	0.05	6	0.6	0.06
VINYL CHLORIDE	4	0.4	0.04	3	0.3	0.03

SOIL (PPB)

TCE	*	800	80	*	100	10
PCE**						
VINYL CHLORIDE***						

* TCE BASELINE RISK NOT LESS THAN (10-4).
** PCE BASELINE RISK NOT LESS THAN (10-6).
*** VINYL CHLORIDE NOT DETECTED IN SOIL.

SOIL CLEANUP MUST ACHIEVE 100 PPB (OR BETTER) OF TCE.

INTERCEPTOR WELLS MUST CONTINUE TO OPERATE UNTIL THE FOLLOWING GROUND WATER STANDARDS ARE MET ON THE EAST SIDE:

TCE	1.0 PPB
PCE	0.6 PPB
VINYL CHLORIDE	0.3 PPB*

* THE ACCEPTABLE VINYL CHLORIDE STANDARD MAY BE MODIFIED SLIGHTLY BASED ON BEST AVAILABLE ANALYTICAL DETECTION LIMITS.

THE WEST SIDE INTERCEPTORS MUST CONTINUE TO OPERATE UNTIL THE PLUME ENTERING THE WELL FIELD FROM THE WEST NO LONGER POSES A CUMULATIVE CONTAMINANT RISK OF GREATER THAN 1 X (10-6). THIS IS CONSISTENT WITH THE ROD FOR OPERABLE UNIT 1 AND IS APPROPRIATE FOR THE WEST SIDE GIVEN THAT WITHOUT A KNOWN RELATIONSHIP BETWEEN SOURCE AND GROUND WATER, CONTAMINANT-SPECIFIC STANDARDS CANNOT BE SELECTED.

IT IS EXPECTED THAT SOIL CLEANUP IN COMBINATION WITH THE EXISTING GROUND WATER TREATMENT PROVIDED BY THE EAST SIDE INTERCEPTOR WELLS WILL RESTORE THE GROUND WATER TO THE CLEANUP STANDARDS. GROUND WATER MONITORING IS NEEDED TO ENSURE THAT CLEANUP LEVELS ARE MET AND MAINTAINED. DEED RESTRICTIONS WILL ENSURE THAT EXPOSURE DOES NOT OCCUR UNTIL CLEANUP LEVELS ARE REACHED.

AIR PATHWAYS RISKS WERE CALCULATED BASED ON THE PERCENT OF TOTAL SITE RISK CONTRIBUTION FROM THE AIR STRIPPER AND ISVE UNDER ASSUMED AIR FLOW RATES. AIR EMISSIONS FROM THE AIR STRIPPER AND THE ISVE UNITS WERE EVALUATED FOR POTENTIAL IMPACTS TO RECEPTORS AND TO IDENTIFY WHETHER VAPOR-PHASE CARBON ADSORPTION TREATMENT MAY BE NEEDED ON THESE UNITS TO REDUCE RISKS TO AN ACCEPTABLE LEVEL. AT ASSUMED FLOW RATES, EMISSIONS WOULD BE LIMITED BY THE FOLLOWING TABLE. FOR EXAMPLE, BOTH THE AIR STRIPPER AND ISVE WOULD REQUIRE STATE REGISTRATION UNDER THE SIP FOR MASS DISCHARGES IN EXCESS OF 15 LBS./DAY. SUCH REGISTRATION MAY OR MAY NOT REQUIRE EMISSION CONTROL MEASURES. IF CONTROLS ARE NOT REQUIRED BY STATE REGULATION, EMISSIONS CAN CONTINUE UNCONTROLLED UNTIL THE SITE RISK BASED CONTAMINANT EMISSION MASS IS EXCEEDED. THE TABLE BELOW SHOWS THAT TCE EMISSION MASS WOULD NEED TO EXCEED 58.06 LBS./DAY IN ORDER TO TRIGGER CONTROLS BASED ON RISK. SIMILARLY, THE ISVE WOULD REQUIRE AN EMISSION MASS OF 31,765 LBS./DAY BEFORE CONTROLS WOULD BE NEEDED BASED ON RISK.

AIR STRIPPER

CONSTITUENT	MASS DISCHARGE (LBS./DAY) 1 X (10-5) RISK	MSP	SIP
TCE	58.06	137	15
PCE	3.89	TOTAL	TOTAL
1,1-DCE	4.17	VOCS	VOCS
VINYL CHLORIDE	LT 0.26		

ISVE

CONSTITUENT	MASS DISCHARGE (LBS./DAY) 1 X (10-5) RISK	MSP	SIP
TCE	31,765	137	15
PCE	1,177	TOTAL VOCS	TOTAL VOCS

MSP - MAJOR SOURCE/MODIFICATION PERMIT LIMIT AT 25 TONS/YEAR
SIP - STATE IMPLEMENTATION PLAN STANDARD AT 15 LBS/DAY

THE MAXIMUM DISCHARGE FROM THE AIR STRIPPER IS EXPECTED TO BE LESS THAN 3 LBS./DAY TOTAL VOCS BASED ON EXPECTED TREATMENT EFFICIENCY AND TREATMENT SYSTEM FLOW RATE. THE MAXIMUM DISCHARGE FROM THE ISVE SYSTEM IS EXPECTED TO BE LESS THAN 2 LBS./DAY. IN BOTH CASES THE DISCHARGES WILL BE WELL BELOW THE RISK LEVEL OF (10-5).

SOME BALANCING OF CONTAMINANT EMISSIONS MASS AND RATE BETWEEN THE ISVE AND AIR STRIPPER CAN OCCUR. THEREFORE, PROJECTED EMISSIONS WILL BE REEVALUATED DURING DESIGN. REGARDLESS OF DESIGN ESTIMATES, PRECISE ESTIMATES FOR ISVE EMISSIONS CANNOT BE MADE DUE TO THE LIMITATIONS INHERENT IN ACCURATELY MEASURING SOIL CONCENTRATIONS WITH EXISTING SAMPLING AND ANALYTICAL TECHNIQUES. THEREFORE, OFFGAS FROM ISVE WILL NEED TO BE MONITORED INITIALLY FOR COMPARISON TO ACCEPTABLE LEVELS.

SOME CHANGES MAY BE MADE TO THE REMEDY AS A RESULT OF THE REMEDIAL DESIGN AND CONSTRUCTION PROCESSES. SUCH CHANGES, IN GENERAL, REFLECT MODIFICATIONS RESULTING FROM THE AVAILABILITY OF MORE DETAILED INFORMATION IN THE DESIGN PHASE.

STATUTORY DETERMINATIONS

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT:

THE SELECTED REMEDY PROVIDES FOR REMEDIATION OF SITE-RELATED CHEMICALS IN SOIL AND GROUND WATER ON THE EAST SIDE. USE OF ISVE ALLOWS FOR UNRESTRICTED ACCESS TO THE LAND AFTER REMEDIATION AND ALLOWS FOR AQUIFER RESTORATION. REMOVAL OF THE PAINT LAYER ALLOWS FOR UNRESTRICTED USE OF THE PROPERTY AFTER IMPLEMENTATION OF THE REMEDY AND IT PROVIDES LONG-TERM PROTECTION. CONTINUED USE OF THE AIR STRIPPER ENSURES A SAFE SOURCE OF DRINKING WATER. INSTALLATION OF THE WEST SIDE INTERCEPTORS ALLOWS RESTORATION OF THE WELL FIELD TO ITS HIGHEST BENEFICIAL USE, CONTAINS THE PLUME OUTSIDE THE WELL FIELD, AND PROTECTS AGAINST LONG TERM UNCERTAINTY.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS:

THE SELECTED REMEDY WILL MEET ALL IDENTIFIED APPLICABLE, OR RELEVANT AND APPROPRIATE, FEDERAL AND MORE STRINGENT STATE REQUIREMENTS. ARARS ARE LISTED ON TABLE 9 AND DISCUSSED IN THE COMPARISON OF ALTERNATIVES SECTION OF THIS ROD. NO ARAR WAIVERS ARE REQUIRED AS DISCUSSED EARLIER. HOWEVER, A SOIL AND DEBRIS TREATABILITY VARIANCE MAY BE USED FOR THE PAINT LAYER TO SATISFY 40 CFR 268.

COST-EFFECTIVENESS:

ISVE IN ALTERNATIVE 2 AND 4 IS A LESS EXPENSIVE MEANS OF ACHIEVING THE SAME LEVEL OF PERFORMANCE AS LTTD IN ALTERNATIVES 3 AND 5. THE CAPITAL COST OF GROUND WATER INTERCEPTION ON THE WEST SIDE REMAINS THE SAME FOR ALL ALTERNATIVES, AS DOES REMOVAL OF THE PAINT LAYER. ALL COSTS ARE ESTIMATED OVER A 40 YEAR PERIOD. THE VOLUME OF GROUND WATER REQUIRING TREATMENT DECREASES OVER TIME WITH ALTERNATIVES 4 AND 5, ALTHOUGH THE CAPITAL EXPENDITURE REMAINS THE SAME. A LESS EXPENSIVE TECHNOLOGY AND LOWER OPERATION AND MAINTENANCE COSTS

MAKE ALTERNATIVE 4 THE LEAST COST REMEDIAL ALTERNATIVE FOR SOIL AND GROUND WATER REMEDIATION AND LONG TERM PROTECTIVENESS OF THE WELL FIELD.

USE OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TO THE MAXIMUM EXTENT PRACTICABLE:

ALTERNATIVE 4 PERMANENTLY REDUCES SOIL CONTAMINATION BY USING ISVE. ISVE IS STILL CONSIDERED AN INNOVATIVE TECHNOLOGY. SINCE VOCS ARE HIGHLY AMENABLE TO TREATMENT, ALL ALTERNATIVES EXCEPT NO ACTION INCORPORATED A TREATMENT TECHNOLOGY WHICH WOULD PERMANENTLY REDUCE CONTAMINATION. THUS, ANY OF THE ALTERNATIVES WOULD HAVE MET THIS CRITERIA. ISVE ELIMINATES THE NEED FOR FURTHER TREATMENT OF RESIDUALS OFF-SITE. ALTERNATIVE 4 PRESENTS THE BEST BALANCE OF LONG - AND SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, REDUCTION IN TOXICITY, MOBILITY AND VOLUME AND OVERALL COST.

SATISFY THE PREFERENCE FOR TREATMENT THAT REDUCES TOXICITY, MOBILITY, OR VOLUME AS A PRINCIPAL ELEMENT:

THIS SELECTED REMEDY SATISFIES THE PREFERENCE FOR TREATMENT THAT REDUCES TOXICITY, MOBILITY OR VOLUME. BOTH THE ISVE AND AIR STRIPPING SYSTEMS REDUCE MOBILITY AND VOLUME IN SOILS AND GROUND WATER. HOWEVER, SINCE BOTH TECHNOLOGIES TRANSFER CONTAMINANTS INTO THE AIR, TOXICITY REDUCTION DOES NOT OCCUR. THE SELECTED REMEDY SATISFIES THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT.